

# The MINING CONGRESS JOURNAL

Volume 16

JUNE, 1930

No. 6

## In This Issue

Coal's Convention and Exposition

Depletion, As Outlined and Defined  
by the Supreme Court

Dividends from Depletion or  
Depreciation Reserves

Mechanized Mining

Longwall Mining at the Mines of the  
Pruden Coal & Coke Company

Research in Underground Mining

Leaching and Cementation  
at the Copper Queen Branch

Flow Sheet of Copper Smelting  
Douglas Reduction Works

Legislative Review

## Contributors

O. E. McMullen, R. S. Gayton, G. B. Southward, Charles A. Griffith,  
Dr. L. E. Young, O. E. Simmons, R. H. Mills.



## How the O'Gara Coal Company Defeated the Law of Averages

During the past ten years there has been an average of one fatality in the coal mines of Illinois for every 430,000 tons of coal mined.

But the O'Gara Coal Company of Harrisburg, Ill., operated nine mines with an average of 2,300 employees throughout the entire year of 1928 without a single accident and produced during that period more than 1,300,000 tons of coal.

This remarkable record is ascribed to a carefully arranged and intensively presented safety campaign—in which almost every employee received first aid training—and during which a wholesome spirit of competition with respect to the prevention of accidents, was developed throughout the entire organization.

In this case, as in practically every instance of sustained safe coal-mining operation that has come to our attention, Ensign-Bickford Safety Fuse was used extensively—ample evidence of its inherent safety when properly handled.

Do Not "Short Fuse"  
--Fuse should be cut  
long enough for the  
end to extend well  
out of the mouth of  
the bore hole when  
the primer cartridge  
is in place.  
All holes should be  
well tamped.



**THE ENSIGN-BICKFORD CO.**  
SIMSBURY CONNECTICUT

# USE RandS Car-Dumpers!



Available in Types  
and Sizes to Suit  
All Conditions

## Power Driven Rotary Car-Dumpers

During the past six years more than three-quarters of our Car-Dumper business has been the rehabilitating of operating plants whose owners have taken advantage of our modern Car-Dumper design, greater dumping speed, reduced labor cost and minimum degradation. It is noteworthy that we have designed, built and erected approximately seven-eighths of all the Car-Dumper installations, using our class of equipment that have been installed during this time.

For speed and high capacity we recommend the RandS Power Driven Rotary Car-Dumper which is available in sizes to handle from 150 to 1500 tons per hour and for dumping from 1 to 25 cars at a time, handling cars of from 1 to 100 tons capacity.

Send for Bulletin No. 128—RandS Power Driven Rotary Car-Dumpers.



## RandS Electric Reciprocating Car Feeders

Read these advantages of the RandS Rotary Car-Dumper—think what the savings of an installation will mean to you in time and money saved — 1—No lugs required on cars. 2—No bending of axles. 3—Absolute control of trip at all times. 4—Adjustable length of stroke for varying conditions. 5—Fewer moving parts—less upkeep. 6—Lower installation cost. 7—Heavy construction by reason of design. Write for further details.

## Shaft Type Gravity Car-Dumpers

The RandS Gravity Car-Dumper is made to operate with equal facility on all types of cars so that it can be adapted to your operations, using the cars you now have and as they become obsolete, new Solidbody Cars can be added.

Designed for either manual or automatic operation. One operator uncouples cars, weighs in and takes check. RandS Gravity Car-Dumpers require no attention whatever from the operator while rotating.

We will be glad to furnish a list of installations in your locality for your inspection.

Send for Bulletin No. 124—RandS Shaft Type Gravity Car-Dumpers.

**ROBERTS AND SCHAEFER CO.**  
ENGINEERS and CONTRACTORS

PITTSBURGH, PA., 418 OLIVER BLDG. WRIGLEY BUILDING, CHICAGO HUNTINGTON, W. VIRGINIA, 314 NINTH AVE.

# The MINING CONGRESS JOURNAL

VOLUME 16

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No. 6

## Contents

### EDITORIALS

Freight Rates and Reformers.....	493	The Justified Superlative.....	496
The Basis of Price Levels.....	494	Golden Opportunity.....	496
Reforestation.....	494	Coal Mining Standards.....	496
Lobbies—What of Them?.....	494	No Extra Session.....	496
Electric Power and Progress.....	495		



### FEATURE ARTICLES

Depletion As Defined and Applied by the Supreme Court in U. S. vs. Ludey—By O. E. McMullen.....	497
Dividends From Depletion or Depreciation Reserves— By R. S. Gayton.....	499
Coal's Convention and Exposition.....	501
Legislative Review.....	518
Mechanized Mining—By G. B. Southward.....	521
Longwall Mining at the Mines of the Pruden Coal & Coke Com- pany—By Charles A. Griffith.....	525
Research in Underground Mining—By Dr. L. E. Young.....	527
Leaching and Cementation at the Copper Queen Branch, Phelps Dodge Corporation—By O. E. Simmons.....	529
Flow Sheet of Copper Smelting, Douglas Reduction Works— By R. H. Mills.....	532

### DEPARTMENTS

LEGISLATIVE REVIEW.....	518
REPORT ON THE MECHANIZATION SURVEY.....	521
PRACTICAL OPERATING MEN'S DE- PARTMENT, COAL.....	525
PRACTICAL OPERATING MEN'S DE- PARTMENT, METAL.....	529
NEWS OF THE MINING FIELD.....	537
WITH THE MANUFACTURERS.....	544

## Practical Operating Men's Department

### COAL

*Longwall Mining at the Mines of  
The Pruden Coal and Coke Company  
Research in Underground Mining*

### METAL

*Leaching and Cementation  
at the Copper Queen Branch  
Flow Sheet of Copper Smelting  
Douglas Reduction Works*

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# ROEBLING

## "BLUE CENTER" STEEL WIRE ROPE



### WireRope Should be Appraised on the Basis of Service

Wherever better service is desired Roebling "Blue Center" Steel Wire Rope is proving its superiority. It is strong; tough; dependable; and gives long, satisfactory life in service—and it is service that counts! The long service of "Blue Center" reduces the number of replacements and every mining operator knows the annoyance, expense and retarded production caused by replacements. All of which conclusively proves that Roebling "Blue Center" is the most economical rope to buy.

Made in constructions and sizes particularly adapted to your requirements.





# DIAMONDS in the ROUGH!

**C**OAL is largely carbon—the same element as in the sparkling diamond!

And—like the diamond—coal is most valuable when separated from the rock and dirt and classified as to fineness or grade!

Just as the cutter's skill adds to the commercial value of the gem—so does the accuracy of the screening process add to the value of coal!

You can greatly increase the value of your coal by screening and grading it with the Hum-mer Electric Screen.

For accuracy in screening huge tonnages, the Hum-mer has never been equalled—it is the world's most thorough high tonnage screen!

It handles higher tonnages with less power and at a higher profit than any other means. It will pay you to investigate the Hum-mer for screening your coal!

Write for catalogue!

THE W. S. TYLER COMPANY  
Cleveland, Ohio  
Manufacturers of Woven Wire Screens  
and Screening Equipment



## HUM-MER Electric Screen



This Jeffrey 35-B cut 6,279 tons of coal in 22 eight-hour days—average of 285 tons per day.

## A GOOD ANTIDOTE For RED INK!

Jeffrey 35-B and 35-L (low) Shortwall Coal Cutters are fine antidotes for that deadly business poison—red ink.

They cut more coal for less money—pep up production, and wallop costs.

Simple control—easy, speedy handling—faster cuts—more cuts per day per machine—all these are characteristic of the Jeffrey 35-B and 35-L.

Feed and handling mechanism are independently operated and controlled. One

setting of jacks is sufficient to cut clear across the face. The self-propelled "handi-truck" cuts to a minimum the time for moving from face to face.

Rough bottom cutting is made easier by ease of handling. Light but sturdy, fast, economical cutters which have become extremely popular in mines wherever the room system is used.



Jeffrey 35-L (low type) Shortwall Coal Cutter

Even though you are not in danger of red ink, you can never have too many of these antidotes.

### The Jeffrey Manufacturing Company

958-99 North Fourth St., Columbus, Ohio

#### BRANCH OFFICES:

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Philadelphia

Denver  
Salt Lake City  
Pittsburgh

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Chicago

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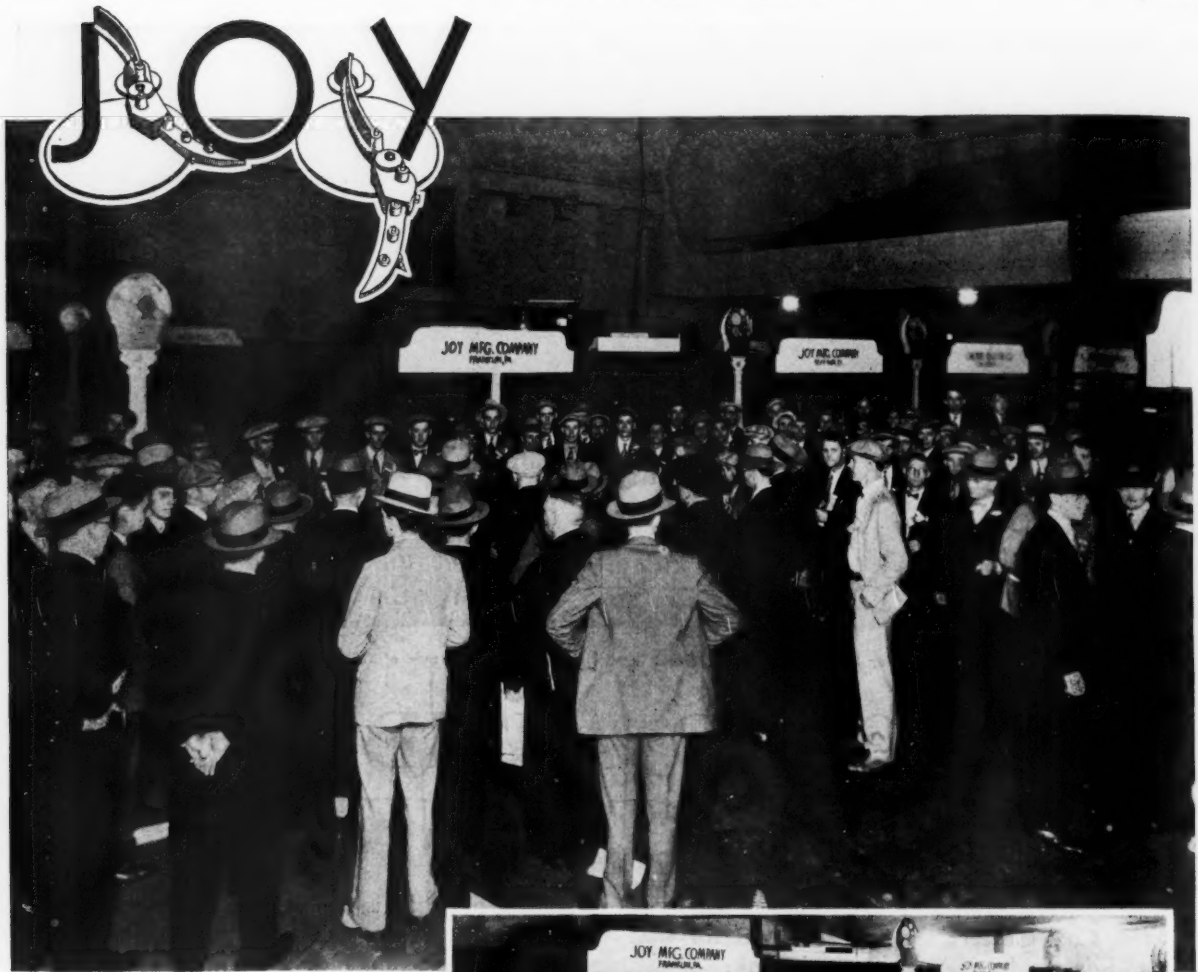
Birmingham, Ala., 1911 Avenue A  
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Pittsburgh, 600 Second Ave.

Ft. Smith, Ark., 217 So. 5th St.

Winchester, Ky., 122 N. Main St.  
Scranton, 122 Adams Ave.  
Salt Lake City, 153 W. Second South St.

JEFFREY MFG. CO., LTD., OF CANADA: Head Office and Works, Montreal; Branch Office, Toronto; Service Station, 210 Ninth Ave., W., Calgary.

# JEFFREY COAL MINE EQUIPMENT

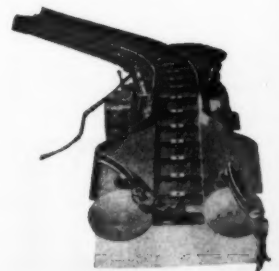


**T**HE crowds at Cincinnati at times hid the new low vein JOY 7-BU LOADER. Joy Loaders have proven so efficient, so flexible and adaptable and so logical in operation that interest in any new JOY development is keen. The 7-BU is identical with the 5-BU except in its 40-inch height and its unique conveyor. It loads two tons per minute; is controlled by one man; moves either on or off track, and is



generally adaptable to all mining conditions. Perhaps the new JOY 7-BU can help you speed production or reduce costs in your properties. Let us send you complete specifications and data.

**JOY MANUFACTURING CO., Franklin, Pa.**







## The Jeffrey Arcshear is the Only Machine that can make a Shearing Cut while standing on a Track Curve

SKINNY: Where are you movin' to? There ain't no more rooms cleaned up that I knows of.

BILL: I'm goin' to No. 12.

SKINNY: Why that's just turned off, you can't do nothin' in that room neck.

BILL: I'll show you.

SKINNY: Well, if she will cut an' shear that place, she sure is a peach.

BILL: Yes, they got everything on this machine, an' it has no bugs or short circuits in it neither.

Talkin' about bugs, I wonder where all the bugs go in the winter time, anyhow.

SKINNY: Search me.

BILL: No—thanks.

SKINNY: Talkin' of short circuits, I was under the old flivver tinkering around, an' my wife she got anxious to go on, an' she said "What's the matter, Skinny?" an' I told her it was a short circuit. "Well," she sez, "Can't you lengthen it, Skinny?"

*Write now for complete data on the New Jeffrey Arcshear machine*

### THE JEFFREY MANUFACTURING COMPANY

958-99 North Fourth St., Columbus, Ohio

#### BRANCH OFFICES:

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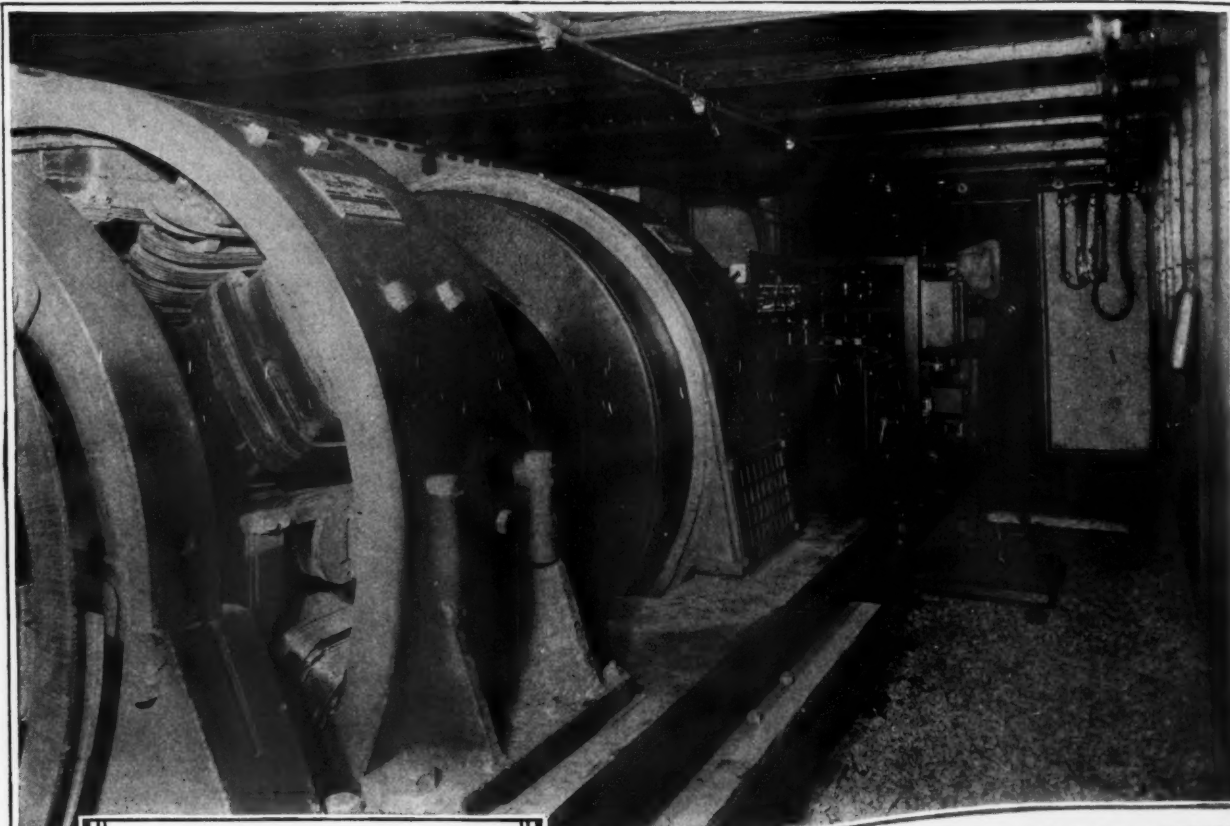
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JEFFREY MFG. CO., LTD., OF CANADA: Head Office and Works, Montreal; Branch Office, Toronto; Service Station, 210 Ninth Ave., W., Calgary

# JEFFREY COAL MINE EQUIPMENT

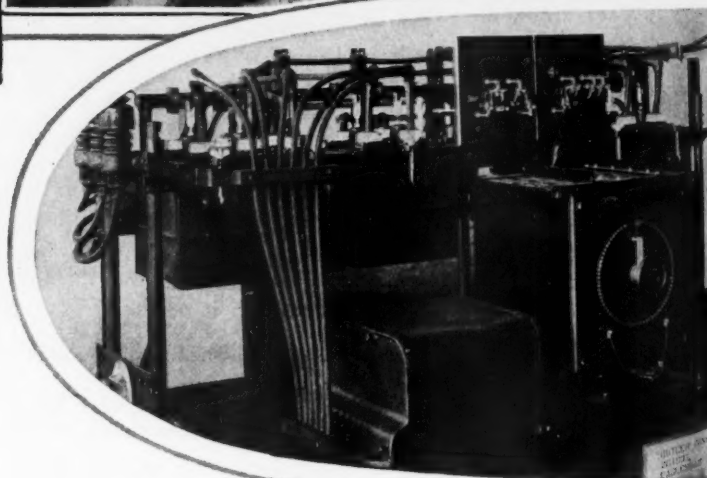
# At Wildwood



*One of two G-E 300-kw. portable substation equipments installed at Wildwood*



JOIN US IN THE GENERAL ELECTRIC HOUR,  
BROADCAST EVERY SATURDAY EVENING  
ON A NATION-WIDE N.B.C. NETWORK



# GENERAL

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

# G-E Substations On Wheels!

**C**ONSIDER the opportunity of lowering operating costs with this pioneer General Electric development.

Completely automatic substations mounted on trucks of standard mine-track gauge with an over-all height low enough to permit of free movement through the mine entries—exactly the type of equipment needed for modern mechanized mining with its rapidly shifting load centers.

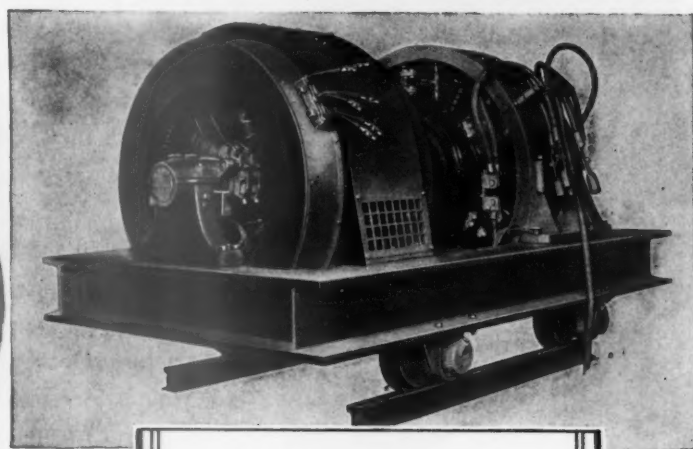
As the load center recedes to the maximum economic distance from the present location of the G-E portable substation, an inexpensive room is prepared adjacent to the new working face. The substation equipment is hauled into the new room, the primary a-c., secondary control, and incoming-line connections are made simply by inserting plugs—and the d-c. connections are quickly bolted on. The entire operation requires less than 6 hours at Wildwood!

All the advantages of maintaining substations adjacent to load centers are obtained at no extra initial cost—for the installed cost of the G-E portable substation is approximately the same as that of the conventional-type substation.

Ask your nearest G-E office for complete details of this extremely interesting equipment.



Close-up of G-E portable automatic switching equipment for 300-kw set at Wildwood



G-E 300-kw., 275-volt d-c., 2300-volt a-c., synchronous-motor-generator set at Wildwood

# ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

500-56



## *The Best Partners on a Hard Job—*

### *G-E Locomotives G-E Line Material*



*A new G-E suspension for attaching to the side of a timber*

*Form HU suspension with renewable insulating unit*

*Form HJ guard-board suspension with removable clamps*

**M**INING service is hard service for any kind of electric equipment, and locomotives and line material are no exception. Yet, these General Electric products have established, through years of service, a performance record of the highest order. And this performance record will continue to stand, because G-E engineers are constantly improving G-E equipment. Take line material as an example. The devices illustrated are but a few of the recent G-E developments for mines. They represent savings in time and labor; they mean much to the safety of workers. Let us describe completely the products which interest you. Address the nearest General Electric office or General Electric Company, Schenectady, N. Y.

JOIN US IN THE GENERAL ELECTRIC HOUR, BROADCAST EVERY SATURDAY EVENING ON A NATION-WIDE N.B.C. NETWORK

**GENERAL**  **ELECTRIC** 370-23  
SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES





They used standard length  
**CARNEGIE COPPER STEEL**  
**MINE TIES** for this turnout

The photograph shows the main haulage way of a large bituminous mine in Southeastern Ohio. Here Carnegie Copper Steel Mine Ties, section M-27, are used under 60-pound rail. An interesting feature is the unique lacing of standard length steel ties at the turnout—an arrangement that has proved most satisfactory and economical.

Carnegie Mine Ties of rust-resisting Copper Steel are available in a wide range of weights and types varying from a very shallow tie for room work, weighing only  $2\frac{1}{2}$  pounds per foot, to a heavy channel tie for main entries, weighing 9 pounds per foot. A number of styles of clips and fastenings care for your individual preferences. Install Carnegie Copper Steel Mine Ties and you can check your trackage as one item efficiently and economically provided for.

*Catalogue will be sent at your request*



**CARNEGIE STEEL COMPANY - PITTSBURGH, PA.**

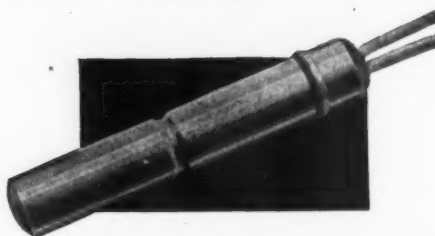
*Subsidiary of United States Steel Corporation*

74

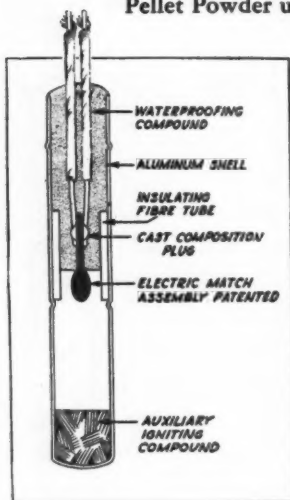
# CARNEGIE COPPER STEEL MINE TIES

# ATLAS

All-Metal,  
Moisture-proof  
Electric SQUIB



A positive Electric Squib is one which cannot be ignited by friction in the act of tamping; one which is so assembled that moisture cannot desensitize the igniting compound either while the Squib is in storage or when in actual application; and one which will produce a flame of sufficient intensity to ignite either Granular Black Blasting or Pellet Powder under all normal conditions of application . . . .



The new ATLAS ELECTRIC SQUIB more nearly fulfills these conditions than any Electric Squib ever offered.

Inasmuch as the tube of the new ATLAS ELECTRIC SQUIB is solid, without vent holes—the water- and moisture-proof plug seals the open end and makes moisture-proof the entire assembly. Moisture and grit, therefore, cannot come in contact with the igniting compound of the match head to either desensitize it through

moisture absorption or fire it through abrasion with grit.

Other features of the assembly as shown by the accompanying sectional view are as follows:

The Cast Composition Plug seals and centers the match head assembly; and, together with the fibre tube, effectively insulates it from the shell;

The MATCH HEAD holds the bridge wire embedded within it and prevents this delicate wire from being broken by any jars to which the Electric Squib might be subjected.

ATLAS Electric Squibs are subjected to numerous tests and inspections before they are packed for shipment.

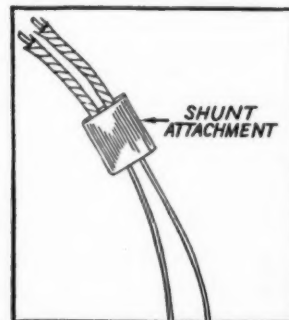
## ATLAS Shunt Attachment

The Atlas Shunt Attachment is a well-worth while safety device that can be supplied at no additional cost with all Atlas Electric Blasting Caps and Electric Squibs.

The danger of the loose contact ends of Electric Squibs coming in contact with electric currents in coal mines is ever present because of the extensive use of electrically driven machinery in the mining of coal. Lives have been lost and property has been seriously damaged by the accidental firing of Electric Squibs in this manner. It is well, therefore, that manufacturers have taken steps to eliminate this danger and the Shunt Attachment, designed and patented by the ATLAS Powder Company, provides the simplest and most effective protection.

The Shunt Attachment short circuits the bare ends of the leg wires and prevents any electric current that might be collected by them from reaching the Electric Match within the Squib.

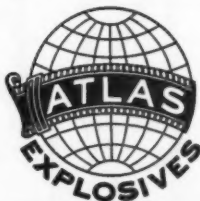
The Shunt Attachment combined with the insulation placed within the shell, completely protects the Electric Squib from accidental firing by stray currents.



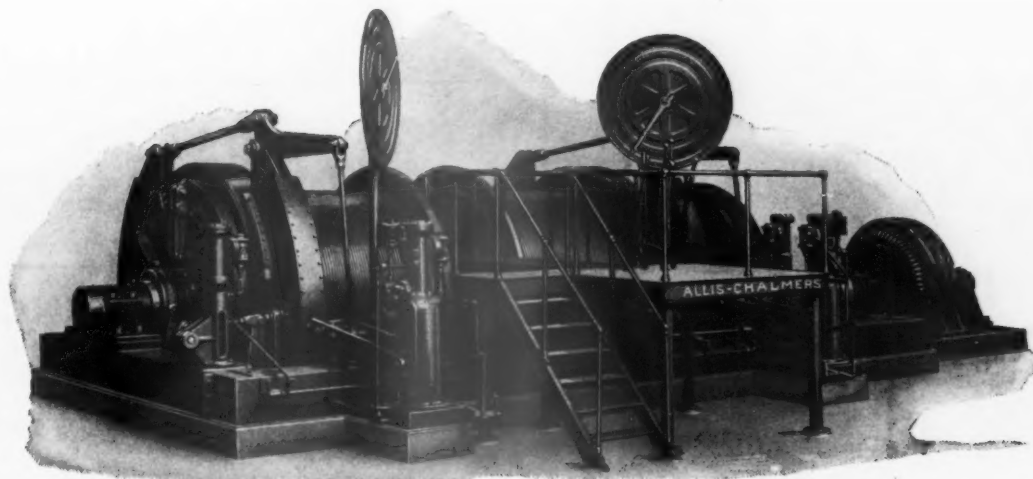
**ATLAS POWDER COMPANY, WILMINGTON, DELAWARE**

### Branch Offices:

Allentown, Pa.; Boston, Mass.; Charleston, W. Va.; Chicago, Ill.; Houghton, Mich.; Joplin, Mo.; Kansas City, Mo.; Knoxville, Tenn.; McAlester, Okla.;



New Orleans, La.; New York, N. Y.; Norristown, Pa.; Philadelphia, Pa.; Pittsburg, Kansas; Pittsburgh, Pa.; Pottsville, Pa.; St. Louis, Mo.; Wilkes-Barre, Pa.



## Kennedy Mining & Milling Co. installs A-C Electric Hoist at Jackson, California, Plant

Combining beauty in appearance with the best and latest features in hoist design, this new Kennedy Mining & Milling Company unit will give years of trouble-free service.

Welded steel plate drums and welded steel frame combine great strength with light weight. Other Allis-Chalmers features give ease of control, safety of operation, and long life.

Allis-Chalmers is the only company building complete hoisting units including hoist, motors of every type, motor-generator sets, where necessary, and control. This not only simplifies construction, installation and maintenance but also is assurance of hoisting equipment that will operate as a unit.

### Specifications of K. M. & M. Hoist

Diameter of Drums.....	8'-0"
Face of Drums.....	6'-0"
Rope (1 1/4" dia.).....	5500 ft.
Weight of Skip.....	5300 lbs.
Weight of Ore.....	9600 lbs.
Maximum Rope Pull.....	28000 lbs.
Maximum Speed.....	1500 f.p.m.

Will hoist from 1 mile  
underground

**Your selection will be  
an Allis-Chalmers Hoist  
if you wish the best.**

*Allis-Chalmers engineering service is at your command.*

# ALLIS-CHALMERS

— Allis-Chalmers Manufacturing Company, Milwaukee —





**KEEPING  
DOLLARS  
FROM  
WAITING  
ON  
DIMES**

## This One Saves You Money!

It's the splicer which fails that costs you money—not the one which stays in service. Just one trip held up because the splicer "gives out" frequently costs more money than a hundred splicers.

The MCM Splicer will not penalize your profit-making haulage. It will keep your trolley wire together and your trains moving. The holding power of this splicer is so great that it will pull new trolley wire in two. It is so easy to install, that no other splicer begins to compare with it. A splicer so strong and so simple as the MCM, is bound to give the satisfaction upon which wide popularity is based. It does and will last longer than the trolley wire.

If you want to "keep dollars from waiting on dimes"; if you want to keep your trolley wire up and your costs down—the MCM will do it for you. How are you fixed for good splicers? (This splicer is shown on page 34, O-B New Products Supplement No. 3.)

Ohio Brass Company, Mansfield, Ohio  
Canadian Ohio Brass Co. Limited  
Niagara Falls, Canada  
1814M

**Ohio Brass Co.**

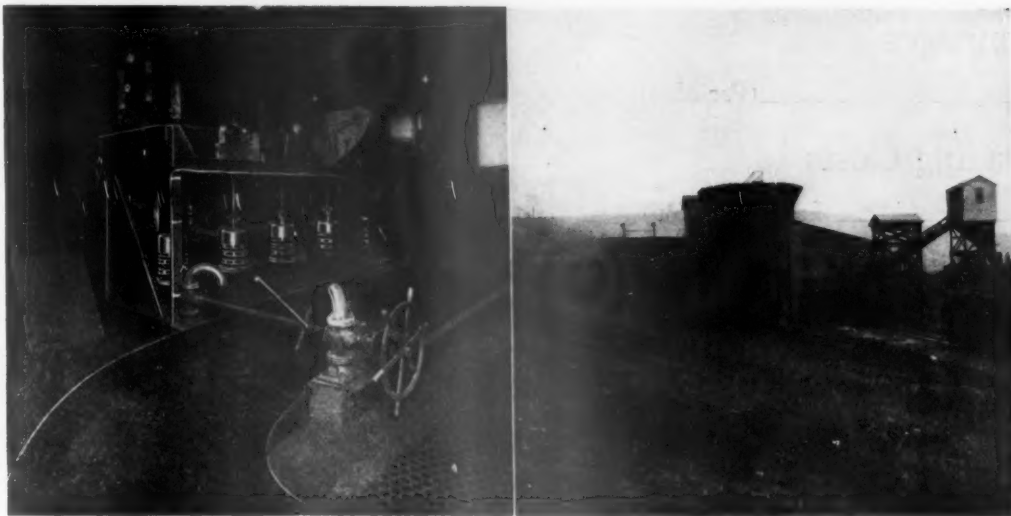
NEW YORK . PITTSBURGH  
PHILADELPHIA . BOSTON

CHICAGO CLEVELAND ST. LOUIS ATLANTA DALLAS  
LOS ANGELES SAN FRANCISCO SEATTLE

PORCELAIN  
INSULATORS  
LINE MATERIALS  
RAIL BONDS  
CAR EQUIPMENT  
MINING  
MATERIALS  
VALVES



# Now "No. 8 Pittsburgh Seam" yields to Link-Belt Simon-Carves cleaning



**I**N installation after installation the efficiency of the Link-Belt Simon-Carves Coal Washing System in purifying coal of a variety of types is being proved.

The above plant of the Wheeling & Lake Erie Coal Company is the first Link-Belt Simon-Carves installation in the Ohio field. Here this System is handling coal from the "No. 8 Pittsburgh Seam"—a good coal, presenting some difficult problems in cleaning.

This Link-Belt Simon-Carves installation is handling coal 4" x 0", with a capacity of

100 tons per hour in a single unit. Ash and sulphur refuse is successfully removed to practically theoretical figures shown by float and sink analysis on the predetermined washing gravity.

The Link-Belt Simon-Carves System, with its ability to wash coal from 0" to 4" simultaneously in a single unit, eliminates expensive presizing.

Write for complete report on service being rendered by Link-Belt Simon-Carves Coal Cleaning Systems thus far installed.

## LINK-BELT COMPANY

CHICAGO

Complete Equipment for the Handling, Preparation and Washing of Coal

300 W. Pershing Road

# LINK-BELT

## Simon-Carves Coal Washeries

# Mine Operators—

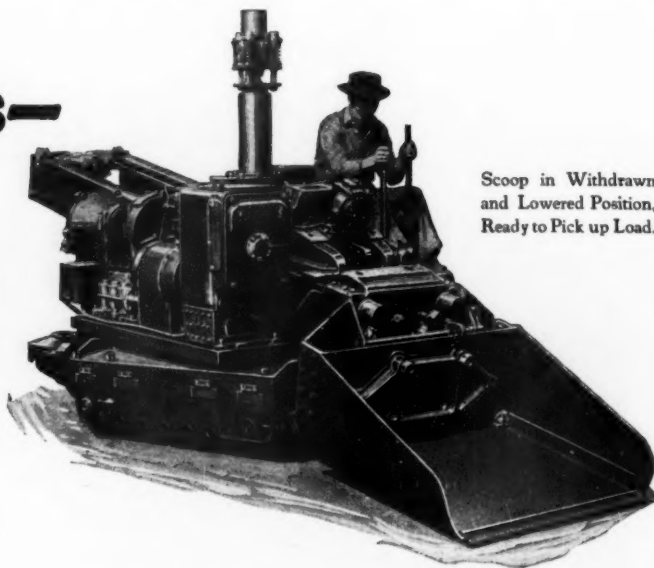
Are You Satisfied  
with the Figures  
for Your Mines?

Tonnages

\_\_\_\_\_ (Per Man)

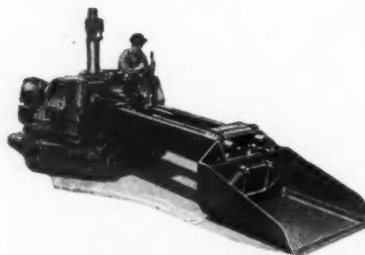
Loading Costs

\_\_\_\_\_ (Labor, per Ton)



Scoop in Withdrawn  
and Lowered Position,  
Ready to Pick up Load.

1. Scoop Thrust Forward as to Pick Up Its Load.



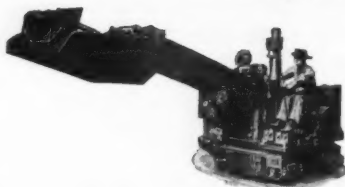
2. Scoop Raised as in Lifting Its Load.



3. Scoop Swung Over the Mine Car.



4. Ejector Pushes the Load from Scoop to Car.



## Goodman Power Shovel (Electro-Hydraulic)

Doubles Tonnages per Man,  
Halves Labor Loading Costs  
in Many Mines

### Its Simple Cycle— Thrust—Lift—Swing—Discharge

Exactly as a Giant might Wield a  
Half-Ton Shovel!

And then, with hydraulic smoothness, the scoop withdraws to its inward position, swings back and is lowered to the floor for another load—

all in one continuous operation—

—a full circle of 360 degrees, if desired.

A power jack to the roof holds the machine in rigid placement.

It will pay you to Investigate this Loader!  
Book 270 tells all about it. Write for a copy.

The thorough mine inspection, always made before a Power Shovel is installed, is a big reason for its universal success. No expense to you. No obligation of course.

Builders of Loading Machinery for 17 Years

# GOODMAN

**Locomotives - Loaders - Coal Cutters**

PITTSBURGH-WILKES-BARRE-HUNTINGTON, W. VA.-CINCINNATI-BIRMINGHAM-ST. LOUIS-DENVER-PRICE, UTAH [32]

**MANUFACTURING COMPANY**  
HALSTED ST. at 48TH.  
CHICAGO---ILL.

# MAN-POWER *Multiplied*

*Means:*  
**PROFIT  
ECONOMY  
SPEED  
VOLUME**

Mr. John L. Lewis, president of the United Mine Workers of America, has expressed the opinion, according to an article in the Mining Congress Journal, that fair wages and higher standards of living are only possible by increased productivity per worker through progressive substitution of mechanical for human power.

With such assurance of moral support and cooperation from the mine workers themselves, what possible obstacle can any far-seeing operator find to prevent efficient mechanization of his production methods?

The record of more than 400 successful installations of the Cosco Conveyor System in American coal mines—not one of which has ever taken "time-off"—proves conclusively that good profits walk hand in hand with modern methods.

Cosco A-20 or B-15 Drives and Troughing, with improved flanged rollers, are profitably applicable to any coal mining condition including yours.

*We shall welcome the opportunity to offer proof.*

**CONVEYOR SALES CO., INC.**

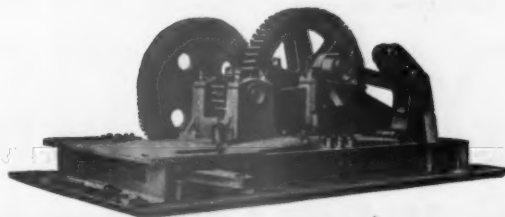
299 Broadway, New York

#### District Sales Offices

Pittsburgh, Pa., 1538 Montier Street, Wilkinsburg.  
Scranton, Pa., Mears Building.  
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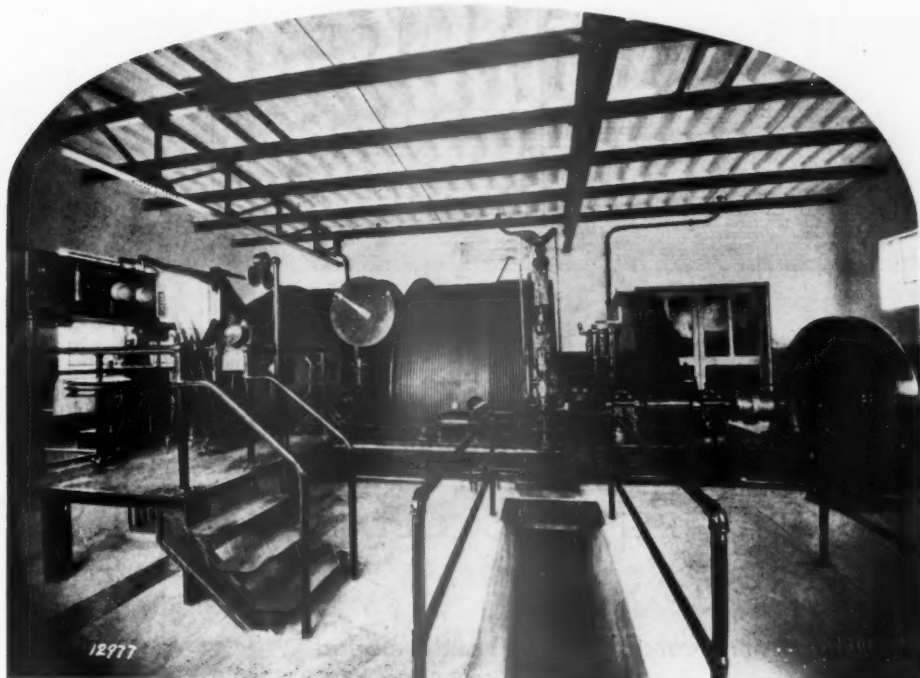
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**The Mining Congress Journal**

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# The STORY of ANTHRACITE



*In the carboniferous period perhaps tropical vegetation such as this covered our present coal bed areas. Millions of years passed before these forest growths became coal*

## *In the July issue:*

Lehigh Navigation Coal Company—  
J. B. Warriner.  
Geology—L. A. Levan.  
Mining System—W. S. Rausch.  
Personnel Training—H. S. Gilbertson.  
Stripping Operations—S. E. Thorne.  
Cleaning, Sizing, Testing Anthracite—  
J. H. Savage.  
Breaker Design and Construction—  
A. G. Frank.  
Research Activities—J. S. Miller.  
Accident Prevention—T. D. Thomas  
and H. J. Seitzinger.  
Medical and Compensation Department—  
F. S. Riordan and Dr. R. H. Kistler.  
Material and Supply Distribution—  
F. R. Edwards.  
Forestry Developments—A. C. Neumuller.  
Power and Transportation—R. E. Hobart.  
Earlier History of the Industry—E. W. Parker.  
Can Anthracite Leap the Hurdles?—  
Anonymous.  
Getting the Product to Market—A. K. Morris.  
Legislation and Anthracite—John C. Haddock.  
Anthracite's Contribution to Prosperity—  
Noah H. Swayne.  
Research and New Markets—R. V. Frost.  
Accident Prevention—C. K. Gloman.  
The Small Domestic Stoker—Allen J. Johnson.  
Service to Consumer—C. A. Connell.  
Industrial Relations—H. S. Gilbertson.  
Early Mining Methods—Eli T. Conner.

from the carboniferous age to the consumers coal bin will be told in the July issue of The Mining Congress Journal. This one of the great Industry Numbers of this magazine that are appearing in 1930 will feature in particular the complete operations of the Lehigh Navigation Coal Company. Profusely illustrated. Titles of some of the papers are listed on the left.



*The JULY Issue of*

# The MINING CONGRESS JOURNAL

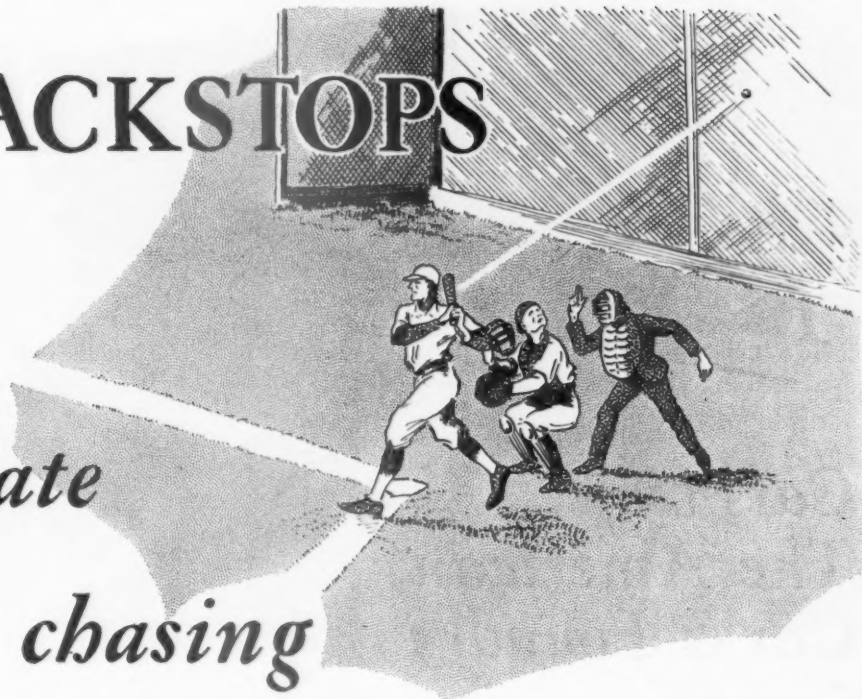


# BACKSTOPS

*...eliminate*

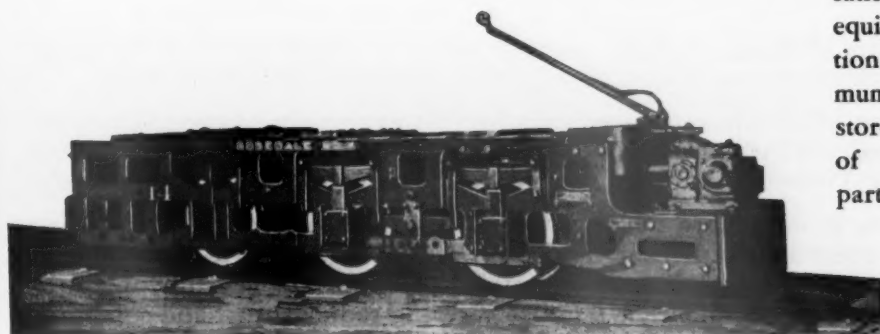
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While the manufacturer "backstops", as far as possible, the satisfactory operation of your equipment, delays in production will be reduced to a minimum if you maintain in your storeroom a complete stock of the essential wearing parts of your equipment.



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The transportation of the coal from the source to the tipples is done on an industrial railway system with special Timken Bearing Equipped cars designed and built by The American Car & Foundry Company, Terre Haute, Indiana.

These cars are of 40-ton capacity, gondola design, all-steel construction, drop-bottom, mounted on two 4-wheel trucks with Timken-equipped journals.

The selection of Timken-equipped cars for this extremely heavy and responsible duty reflects the experience of the majority of the mine operators of the country—for Timken is now the standard car bearing of the mining industry.

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# The MINING CONGRESS JOURNAL

A Monthly Magazine—The Spokesman For The Mining Industry—  
Published By The American Mining Congress

VOLUME 16

JUNE, 1930

No. 6

## Editorials

### Freight Rates and Reformers

MANY years ago a distinguished Senator thought he saw a necessity for a complete valuation of the railroads of the United States.

This valuation was to be made in order that the public might know the exact cost of transportation as a protection to itself against unfair freight rates.

Many years have elapsed and millions of dollars have been spent in this foolish effort to substitute the judgment of a few individuals for the law of "supply and demand."

The history of this country proves conclusively that whenever any business becomes too profitable that capital is available for the development of competition, through which the cost of any particular service is always brought to a proper level.

There is but one field in which competition may not be relied upon to protect the public against exorbitant rates. Wherever an industry is based upon a controlled natural product, it might be possible for a large organization to gain control of a natural resource and for a time exact an undue price for its product. But even in this field exorbitant profits usually lead to the creation of substitutes, often as good, and frequently better than the original article.

In the case of public utilities, where a monopoly is essential to cheap production the public has the power to protect itself against exorbitant charges through state utility commissions.

There is a vast difference in the value of railroads. Each must perform service upon a competitive basis without reference to the cost to the railroad whether the rate charged yields a profit or whether the particular charge is done at a loss, so that if the valuation could have been perfected upon the plan originally outlined, it could have made but little difference to the public. Under this valuation law an effort was made to fix the original cost as the present value of the several railroads.

After many years of squandered effort the courts in the O'Fallon case decided that the present value of duplication should be the basis upon which a railroad might be permitted to earn a fair rate. A desperate effort will be made to set aside this decision, but in the end the principle will be approved because no other would be just.

Without question the intentions of the reformer who started in motion this great extravagance were of the best.

At a later date the farming industry found itself operating under disadvantage. Congress undertook to assist the farmer by a requirement that transportation rates should be based upon the necessities of the producer rather than upon the cost of service. The Hoch-

Smith bill provided for a complete investigation of the basis of freight rates with the purpose of granting relief to the farmer. This relief to the farmer could only be granted by placing an additional burden upon other industries.

In the search for a burden bearer, on behalf of the farmer, the mining industry seemed a likely field for investigation. The mining industry furnishes more than half the total tonnage handled by the railroads of the United States. Under Docket 17,000, hearings are now being held in the various Western mining centers. It seems probable that the Interstate Commerce Commission, in conducting these hearings, will find that the mining industry is in greater need than the farming industry. Many mining towns have lost a large part of, and in some instances their entire population. Railroads are continually asking the privilege of taking up their tracks in mining states because the amount of ore which can be transported at the present freight rate does not justify the continuance of the service. This is not because there are not large beds of ore, which some day will be required by the industries of the nation, but that unlimited competition in the mining industry has forced down the price of metals to a point where low grade ores can not stand the cost of transportation and treatment charges.

In a recent hearing in Salt Lake City, Governor Dern pointed out "that silver had touched the lowest point in its history; lead is lower than at any time since 1919 except for the disastrous year of 1921; copper is down to pre-war levels and zinc lower than lead, with no relief in sight." The price of gold, he said, is stationary, but the purchasing power has declined severely.

"It is, therefore, obvious," Governor Dern continued, "that the metal mining industry is not enjoying an era of prosperity which enables it to assume added burdens."

Mr. A. G. Mackenzie, secretary of the Utah Chapter of The American Mining Congress, pointed out that "under such circumstances it will be necessary for the United States Government to safeguard its mining industry by fair treatment or the livelihood of thousands of persons engaged in mining will be jeopardized and agriculture's largest and best paying market will be crippled."

Undoubtedly the authors of these two costly investigations sincerely believed that good results would follow. The fact is, however, that millions of dollars in expenses, years of turmoil and business disturbance have inured to the Government, while the railroads and that part of the public involved in the results of these investigations have spent still more millions in defending themselves and yet we wonder why transportation rates are high, all of which in the end must be paid by the consumer.

Truly the reformer is a costly luxury.



### *The Basis of Price Levels*

**T**HE every changing world price levels is always an index, although an extremely complicated index, of the relation of purchasing power to property. If all the gold in the world were controlled by one individual he would be able, with that gold, to buy all the property in the world. This statement, while subject to qualification, is in a general way true.

The measure then of gold and its substitutes, as related to the world market supplies, is the basis of world prices. The gold standard is gradually being adopted throughout the world. The success of business in the more progressive countries has been largely predicated upon a sound money medium, interchangeable everywhere at a given face value.

The critics of this theory will ask—"How then is it that while the worlds supply of gold is not materially increased by the worlds gold production in any one year, yet prices and price levels have been advanced in a ratio very largely in excess of the increase of the worlds gold."

The answer is that the uses of gold have been greatly multiplied by the use of tokens of exchange and that business moving at a much more rapid pace has made it possible to pay many bills daily instead of a few.

Perhaps no agency has accomplished greater facility in the use of gold than the Federal Reserve Bank. The gold standard does not anticipate that gold will always be used in exchange but that the token, which represents it, can at all times be turned into gold—should necessity arise.

The concentration of gold reserves in such a way that they may be called upon to meet emergencies, wherever such may arise, has made possible an increase in price levels much greater than the increase in gold supply.

But what of the future? Many European countries, forced to give up their gold to meet war emergencies, are gradually working toward an accumulation of gold. Far eastern countries, which until the very recent past have been satisfied with the use of silver, are being induced by the example of prosperity under the gold standard to give up the use of silver as a measure of value and to adopt the gold standard.

Gold will always drift to that market in which it will command the highest return. World War conditions are being forgotten and the effort everywhere is to return to normal conditions in which a stable money medium will make possible better business conditions.

It may be assumed that the division of the worlds gold among its nations before the Great War had been made in accordance with the dictates of world necessities. A return to that ratio would leave the United States with one-third less gold than it now possesses. Will this country be able, under that condition, to maintain its price levels or will there be a continual shrinkage of prices, and will that shrinkage in prices enforce a contraction of business operations.

Business booms on a rising market. The reverse prevails on a falling market. Lower price levels are essential to an increase in gold production. The production of gold in the United States is less than half what it was before the war.

Little relief can be anticipated, either from new gold discoveries or increased efficiency in gold mining operations. Only a lowering of price levels will stimulate any great increase in gold production.

The problems involved in the relation of gold to the business of the world are such as to call for most careful thought and to lead economists to a study of means by which the burden on gold production may be relieved.

### *Reforestation*

**F**OR several years the National Tax Association has devoted to at least one of the sessions of its annual conferences to the subject of reforestation. All of these discussions tend to show that during the last 15 years the increase in the selling price of standing timber has not equalled the increase in taxes imposed upon it during the same period. The result has been that private owners of timber lands have felt compelled to cut their standing timber without regard to the injurious effects of forcing the resultant product upon an unwilling market. It appears that production has been so great and competition so keen that it has been impossible to obtain prices which would permit a reasonable profit. Thus, ruinous production of merchantable timber from privately owned lands has made the questions of conservation of timber resources and reforestation vital issues in the economic situation of this country.

In the Pacific Northwest lumbering has been the major industry for many years. It has been estimated that this industry employs 65 percent of the wage earners of that section, thus supporting more than one-half its population. Any plan that will help bring about the successful perpetuation of the forests of that region, as well as of the United States, would be welcomed by the people dependent upon the lumbering industry for their livelihood.

In many of the timber producing states, logged-off lands have been allowed to revert to the states on account of non-payment of taxes. This has been due to the fact that there was no inducement for the private owners to hold them, and no incentive or inclination on the part of anyone to inaugurate and conduct reforestation operations. One of the reasons given for this is that because of constantly changing political administrations it has been considered impossible to undertake and expect stability in any plan of protecting and reforesting logged-off lands.

The setting aside by the Federal Government of a vast proportion of the public domain as forest reserves does not in any sense solve the problem. National forest reserves may preserve a playground for the people and may afford a refuge for wild life. They will tend to conserve and perpetuate an adequate water supply and be of assistance in flood control, as well as in the prevention of soil erosion; but they do not, in any substantial sense, insure a lasting supply of lumber, pulp-wood, wood chemicals, and other forest products. Something else is necessary. Special legislative measures are needed and special financial inducements must be afforded by the states and by the Federal Government, perhaps such as entire exemption from taxation of growing forests until such time as the timber is marketable, before it will be considered worth while to retain ownership of cut over or logged-off lands for the purpose of perpetuating timber values and producing new crops for the utilization of future generations.

### *Lobbies—*

#### *What of Them?*

[Reprinted from *The Mining Congress Journal*, June, 1921]

**E**VERY now and then some orator who has run out of soap, or some agitator who never used soap, reels off a few yards about a "powerful and insidious" lobby down at Washington. Sometimes it is called the "invisible government," and sometimes the "interests," but always it is "powerful" and, if not expressly used, the characterization "insidious" is always implied.

How come? How do they get that way? What is there inherently wrong in telling a legal representative



of all the people just what you—one of the people—think he ought to do in a given set of circumstances? Let's think about it for a moment and see how utterly vapid and nonsensical all such references to the existence of a lobby generally are.

We have in Washington close on to six hundred Senators and Congressmen. Each of them hails from a particular state, but all of them are Senators and Congressmen of and for the whole United States. No one of them can possibly know all there is to be known about any one question upon which he is expected to cast a vote, let alone all that there is to be known about all of the issues which come before Congress. More than three thousand measures are pending now! The only manner in which they can arrive at the knowledge required in casting an intelligent vote is by acquiring information from persons who possess the facts, and naturally they are the interested parties, pro and con. In actual practice every bill is referred to a committee. The committee makes a thorough investigation and reports its conclusions, upon which the average member of Congress largely relies in casting his vote. These committees frequently call upon organizations representing the several industries to furnish the facts upon which their conclusions are to be based.

It must not be forgotten that for every person who wants Congress to do a certain thing there are one or more persons who oppose its being done. Under a Republican government which professes to grant bona fide representation wherever it imposes taxation, each and every one of them is entitled to be heard. And the best way to make themselves heard is to go direct to headquarters and talk face to face with the men who have the deciding voice.

President Harding is not a recluse; neither is he an autocrat. His expressed desire to "get together and talk things over" is one of the strongest and most popular planks in his work-a-day platform. Congressmen, Senators and administrative officials are glad to be advised, and not only accept advice from persons and associations resident in the Capital but seek and secure additional guidance from other cities and rural communities. The lawmaker who would retire within the cloistered seclusion of his own impenetrability and close the door of his office upon his constituents would be an ingrate, an egotist, or a snob, if not a plain fool.

There are in Washington more than fifty organizations and, at times, thousands of individuals, looking after their own interests as affected by government. Included among them are the miners, the school teachers, the lumbermen, the prohibitionists, federated religious bodies, the merchants, the laboring men, the manufacturers, the soldiers, the consumers, the women and the farmers. Nearly every class which adds to the health, wealth or happiness of the Nation is represented here. To condemn one of them is to condemn all, for they are all in the same boat.

Representatives of the farmers, by the way, were making their influence felt at both ends of Pennsylvania Avenue before any of the other "powerful" organizations complained of were incorporated and before the grandfathers of our oldest lawmakers were born. In this circumstance is found the reason where there are no national laws burdensome to agricultural interests and the basis for the belief that an emergency tariff act for the protection of farmers would be one of the first laws passed by the present extra session of Congress. But the farmers are to be congratulated, not condemned, for thus protecting their own welfare, and similar praise should be accorded all other interests which pursue the

same course. Had a greater number of organizations and individuals shown a disposition in past years to assist in the enactment, interpretation and administration of national laws, we would have fewer taxes and fewer laws and better laws today and the Administration would not now be confronted with such a heavy task in bringing about less government in business and more business in government.

The problems of today and tomorrow and the next four years concern us all alike. The quickest and most righteous way of effecting their solution is to get together in Washington. Not by silence and aloofness can agriculture, mining, manufacturing and commerce best promote the public welfare, but rather by consultation and cooperation at all times with the constituted governmental authorities. If this amounts to lobbying—and it certainly does—then lobbying is to be encouraged and the country is to be congratulated that we have it.

Unless the man who rails against lobbying be a demagogue bidding for attention, he is generally found to be someone who has been opposed at Washington by someone who was more successful than he. Whoever can answer his opponent's arguments or checkmate his stratagems will do so without resorting to an attack upon his character.

This is a government of red-blooded men and women, by and for red-blooded men and women. It is wrong to think that citizens who come to Washington to make their wants known and their influence felt are crooks who need watching, and equally fallacious to assume that Congressmen and Senators are weaklings who need protection from power and insidious lobbyists. Let's cut out the extermination and recrimination; get busy and pull together. In the multitude of counsel there is wisdom.

### *Electric Power and Progress*

THE Department of the Interior reports a 11 percent increase in the production of power by public utilities in 1929. The figures are:

1928—87,849,579,000 kilowatt hours.

1929—97,294,000,000 kilowatt hours.

Our expanding industrial life and our increasing population are reflected in the above figures. We are enjoying more comforts and our leisure for rest and recreation is increasing directly as the productivity of our workmen, better aided as they are through increasingly applicable electrical power.

Coal in steam sizes and in powdered form furnished a large proportion of the power in 1929, and a still larger consumption is estimated for 1930. Water power in the generation of electrical energy is subject to the vagaries of drought, flood and severe winter temperatures. It is frequently found that coal-fired generating plants attain distinct economies under the power costs of the hydroelectric installations. For the future, coal may expect much in disposing of its wares from the public utility power plants of the country.

Reciprocally there is a need in the work of producing coal for a greater expenditure of electric power in the mines. Few will hold to the contention today that man power is cheaper than electric. Consider the situation underground in the coal mines of the United States today where practically 90 percent of the coal produced is still loaded by human beings through the agency of hand shovels and strong backs. The greater part of this labor is toilsome, unnecessary and represents an appalling waste in industry. There exists today devices impelled by electric motors, capable of meeting the need of every

loading problem to be found underground in our coal mines. Why should we in this land and in this age continue the practices of the past 700 years in the use of hand-powered picks and shovels. Electric power is available. We are Americans. Let us use it.

### *The Justified Superlative*

**S**UPERLATIVES were in order at this year's Coal Industry Convention and Exhibition. They were frequently applied to the convention and exposition. The program was most comprehensive, including in its papers discussions of every phrase of operation from blasting at the face to cleaning at the tippie. The Exposition was by far the largest and most interesting yet held, the entertainment was delightful, and the attendance surpassed any previous year.

The meeting marked the seventh milestone in the history of coal's progress toward "lower-costs-per-ton," and represented seven years of intensive, cooperative effort on the part of the industry and the manufacturer who helps it solve its production problems.

The coal industry represents an investment of approximately fifteen billion dollars, which is a sizeable sum. Its condition is well known, and even the uninterested public know that coal isn't prosperous, that it is desperately fighting to improve its condition.

These Cincinnati meetings are one avenue of approach to the problems of the industry. Costs must come down, or coal must sell at a higher figure. Efficiency must be maintained. And first, last and always, Safety must be a vital issue. The operating personnel of the industry is, therefore, faced with cost reduction; increasing its safety factor; training its great army of untrained men in the ways of the machine, and it must in order to do these things, be informed.

At Cincinnati the opportunity to gain quickly up-to-the-minute knowledge in blasting, cutting, loading, hauling and cleaning coal is unsurpassed. This year more than 2,000 coal operators took advantage of the opportunity. Hundreds of companies sent their men that they might come home better equipped for their jobs. It was a most worth-while meeting in every sense of the word.

### *Golden Opportunity*

**A** PROMINENT operator, in sizing up the advantages of these May conventions, said: "The convention and exposition offer real opportunities for the staff of the average coal mine to secure, in a few days, a reasonably comprehensive review of machinery and equipment available, and of methods in use. Nowhere in the United States is there such an assembly of coal-mining machinery and men versed in the use of such machinery.

"It offers to the operator, the engineer and the manager, in addition to the actual exhibition of machinery and equipment, a place where men in search of information and ideas may meet formally in meetings and conferences, and less formally on the floor of the exposition hall, to discuss experiences and operating methods.

"The exposition is a place for the young men to make contacts and to profit from the experience of the veterans in the industry; it is a place for the old timer to check up on what new devices are available to reduce operating costs; it is a place for the operating officials striving to solve problems in mechanization to find someone who has dealt successfully with similar difficulties and who will be willing to pass to others the essentials of his experience."

Those who attended the meeting will agree; those who

were less fortunate can only plan, another year, to take full advantage of this remarkable opportunity.

### *Coal Mining Standards*

**T**HE American Mining Congress is continuing its program looking toward standardization of equipment and simplification and safeguarding of practice in mining. A new project covering the design and details of coal mine locomotive construction and practice in the use of such locomotives has been inaugurated with the National Electrical Manufacturers Association and The American Mining Congress as joint sponsors. An organization meeting of this committee has been held and details of procedure discussed and outlined. Simplification is needed in the matter of bumper heights, clearances, placement of trolley-pole sockets, placement of operations; and many harmful practices in the use of locomotives that have grown up should be abolished.

The Mine Drainage Committee of The American Mining Congress is completing its revision of the present Tentative American Standard on Drainage. The new recommendations are considered to be the finest set of Mine Drainage Rules and Specifications available. Certainly they offer the operator, who is not an expert in the problems of drainage, many sound and helpful ideas for the purchase, installation and operation of pumping equipment.

The revision and expansion of the present standard on Coal Mine Tracks is progressing very nicely. At a recent meeting matters of standard lead lengths, guard rail length, contour and placement, tie spacing the type of switches were decided upon. The standard of 5-in. heel spread for all weights of rail and numbers of frogs was agreed upon. This, alone, will result in enormous simplification. The committee plans to develop specifications on all track equipment and recommendations covering proper installation.

This helpful cooperative work on the part of prominent manufacturers and operators offers the industry a much needed program of simplified practice and equipment. All these committees of The American Mining Congress, of which there are twelve in the Coal Mining Branch, deserve the active support of operators everywhere. Their recommendations, when completed, should be put into general use because they represent a consensus of the best opinion in the industry.

### *No Extra Session*

**S**URELY President Hoover is aware of the disadvantage of special sessions of Congress and, no matter what the provocation, will not be inveigled into calling one. Congress has been in almost continuous session since April, 1929, and the country has been subjected to a period of uneasiness that is patently manifest in business activities. Give us a rest.

Congressional disagreements have been rampant; retaliatory methods are in evidence; and little of a constructive nature has been accomplished. We are still in the throes of a "limited" tariff revision; still awaiting the far-famed farm relief, not to mention prohibition, which is a subject too tough even for the tried and true Congressional teeth.

But aside from our wants and wishes, Congressmen are human after all, and they should be permitted surcease from this constant bickering, from annoying pressure from near and far, and from the physical and mental stress of keeping informed upon the many and intricate problems before them. And business is entitled to a rest from uncertainties. By no means a special session, Mr. Hoover!





Photo by Horydesak

*The towers of the Naval Radio Station, NAA, from  
the Washington side of the Potomac*

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# DEPLETION

## *as defined and applied by the Supreme Court in U. S. vs. Ludey*

*With particular reference to the 5 percent limitation under the Revenue Act of 1913, and the application of the same reasoning to non-taxable distributions from March 1, 1913, capital to share holders in mining companies and depletion deductions of operating owners*

By O. E. McMullen \*

**THE** Treasury regulations under revenue acts prior to the Ludey decision required that in all cases the full amount of depletion sustained, whether legally allowable or not, be deducted from the base—including computation of gain or loss in the case of sale.

*It is my belief that the procedure mentioned in the preceding paragraph is the result of considering the problem, and its solution, from an economic instead of a statutory base.*

In U. S. vs. Ludey, which was a question arising under the 1917 act involving the gain or loss on the sale of oil properties, the Supreme Court reversed the decision of the Court of Claims and did not sustain the Treasury regulations. Depletion was defined in the following terms:

"The depletion charge permitted as a deduction from the gross income in determining the taxable income of mines for any year represents the reduction in the mineral contents of the reserves from which the product is taken. The reserves are recognized as wasting assets. The depletion affected by operation is likened to the using up of raw material in making the product of a manufacturing establishment. As the cost of the raw material must be deducted from the gross income before the net income can be determined, so the estimated cost of the part of the reserve used up is allowed. The fact that the reserve is hidden from sight presents difficulties in making an estimate of the amount of the deposits. The actual quantity can rarely be measured. It must be approximated. And because the quantity originally in the reserve is not actually known the percentage of the whole withdrawn in any year, and hence the appropriate depletion charge, is necessarily a rough estimate. But Congress concluded, in the light of experience, that it was better to act upon a rough estimate than to ignore the fact of depletion."

As to the proper amount of depletion to deduct in arriving at the gain or loss on sale the Supreme Court, in the Ludey decision, used the following clear and explicit language:

"The Court of Claims erred in holding that no deduction should be made from the original cost on account of depreciation and depletion; but it does not follow that the amount deducted by the Commissioner was the correct one. The aggregate for depreciation and depletion claimed by Ludey in the income tax returns for the years 1913, 1914, 1915, and 1916, and allowed, was only \$5,156. He insists that more can not be deducted from the original cost in making the return for 1917. The contention is unsound. The amount of the gain on the sale is not dependent on the amount claimed in earlier years. If in any year he has failed to claim or has been denied the amount of which he was entitled, rectification of the error must be sought through a review of the action of the Bureau for that year. He can not choose the year in which he will take a reduction. On the other hand, we can not accept the Government's contention that the full amount of depreciation and depletion sustained, whether allowable by law, as a deduction from the gross income in past years or not, must be deducted from cost in ascertaining gain or loss. Congress doubtless intended that the deduction to be made from the original cost should be the aggregate amount which the taxpayer was entitled to deduct in the several years."

The 1928 revenue act provides as follows:

"Section 115 (b). Source of Distributions. . . . Any earnings or profits accumulated, or increase in value of property accrued, before March 1, 1913, may be distributed exempt from tax, after the earnings and profits accumulated after February 28, 1913, have been distributed, but any such tax-free distribution shall be applied against and reduce the basis of the stock provided in section 113."

Section 113, Basis for Determining Gain or Loss, referred to above, contains the following provisions:

"(b) Property acquired before March 1, 1913.—The basis for determining the gain or loss from the sale or other disposition of property acquired before March 1, 1913, shall be: (1) The cost of such property . . . or (2) the fair market value of such property as of March 1, 1913, whichever is greater."

As to the computation of net income, under supplement B, the following pro-

vision is found in section 111, Determination of amount of gain or loss:

"(a) Computation of Gain or Loss.—. . . the gain from the sale or other disposition of property shall be the excess of the amount realized therefrom over the basis provided in section 113, and the loss shall be the excess of such basis over the amount realized."

"(b) Adjustment of Basis.—In computing the gain or loss under subsection (a): (2) The basis shall be diminished by the amount of the deductions for . . . and depletion which have since the acquisition of the property been allowable in respect of such property under this act or prior income tax laws. . . ."

The depletion deductions are governed by the following section:

"Section 23 (m). Basis for Depreciation and Depletion.—The basis upon which depletion, . . . are to be allowed in respect of any property shall be as provided in section 114."

Section 114 (b). Basis for Depletion, reads as follows:

"(1) General Rule.—The basis upon which depletion is to be allowed in respect of any property shall be the same as is provided in section 113 for the purpose of determining the gain or loss upon the sale or other disposition of such property. . . ."

It would, therefore, appear that in all cases proper adjustment of the base should be made by deducting the depletion allowable under all acts. This would contemplate the deduction of a reasonable allowance under all acts, except the revenue act of 1913, until the March 1, 1913, value had been returned to the taxpayer tax-exempt.

In pursuing the subject further we find that G. C. M. 6746 has been issued on section 23 (m) and is applied to the revenue act of 1928 and prior revenue acts on the amount returnable through depletion and depreciation deductions in the case of an operating owner, part of which reads as follows:

"In the computation of depletion and depreciation, however, the basis is the cost (or other basis) minus the depletion and depreciation sustained, whether legally allowable or not." . . . (See Thompson Oil & Gas Co. vs. Commis-

\* Secretary, The Lucky Tiger-Combination Gold Mining Company, Kansas City, Mo.

sioner, 15 B. T. A., 993† distinguishing United States vs. Ludey, *Supra.*)

The Thompson case was under the provisions of the revenue act of 1918, and related to an entirely different section of the statute from that considered in the Ludey decision. In the Thompson case the taxpayer was endeavoring to obtain a higher depletion rate for a given year, which the Board of Tax Appeals considered was not a reasonable depletion rate for that year.

Apparently the question referred to in the following quotation was not before the Board of Tax Appeals, but we find the following language used in the Thompson case:

"When exhaustion of the capital value occurred from March 1, 1913, to December 31, 1915, of \$91,686.15, and the peti-

†Since this article was written the United States Circuit Court of Appeals, Tenth Circuit, has handed down a decision in the Thompson Oil & Gas Company case reversing the Board of Tax Appeals, the syllabus of which reads as follows:

"In computing the depreciation deductible for 1918 by a lessee under an oil and gas mining lease, the recoverable leasehold value as of March 1, 1913, should be reduced by the amount 'allowable,' as contrasted with 'sustained,' depletion from March 1, 1913, to December 31, 1917, in determining the cost of the reserves remaining on January 1, 1918, the principles laid down in United States v. Ludey, 274 U. S. 295, being held to be controlling."

The following statement is found in the decision: "Theoretically, the rate per barrel of depletion is determined each year, after deducting the depletion for the preceding year from the capital investment and the production for the preceding year from the oil reserves; but, unless a part of the oil reserves is sold or new oil reserves are acquired, the rate per barrel remains constant."

tioner was entitled to deduct only \$6,322.02 of this amount, the excess which the petitioner was not entitled to deduct had as truly disappeared from the capital value as if it had been allowed as a deduction."

The statement quoted above is true from an economic point of view, but the same argument would equally apply to the Ludey case. Again, it would seem that the solution of this problem is one of statutory construction.

As the value of the mine at March 1, 1913, is capital to both the operating

owner and the stockholder, whether they sell the mine or dispose of it by gradual sale—operation—each taxpayer should receive this value tax-exempt as it accrues.

The table below will illustrate how the economic and statutory bases work out in actual practice.

The purpose of the law in establishing a March 1, 1913, value was to secure to taxpayers their right to have their capital at that date returned tax-exempt when, as, and if the property is sold or disposed of.

Value \$1,800,000, divided into 1,800,000 units at \$1 per unit.					
Year	Units	Operating Basis		Sale Basis	
		Sustained	Allowed	Allowable	Limitation
1913.....	100,000	\$100,000	\$10,000	\$10,000	5% of gross
1914.....	120,000	120,000	12,000	12,000	5% of gross
1915.....	120,000	120,000	12,000	12,000	5% of gross
1916.....	120,000	120,000	120,000	120,000	Reasonable
1917.....	120,000	120,000	120,000	120,000	Reasonable
1918.....	120,000	120,000	120,000	120,000	Reasonable
1919.....	120,000	120,000	120,000	120,000	Reasonable
1920.....	120,000	120,000	120,000	120,000	Reasonable
1921.....	120,000	120,000	120,000	120,000	Reasonable
1922.....	120,000	120,000	120,000	120,000	Reasonable
1923.....	120,000	120,000	120,000	120,000	Reasonable
1924.....	120,000	120,000	120,000	120,000	Reasonable
1925.....	120,000	120,000	120,000	120,000	Reasonable
1926.....	120,000	120,000	120,000	120,000	Reasonable
1927.....	120,000	120,000	120,000	120,000	Reasonable
1928.....	120,000	20,000	20,000	120,000	Reasonable
1929.....	120,000	.....	.....	120,000	Reasonable
1930.....	120,000	.....	.....	86,000	Reasonable
Capital .....		\$1,800,000	.....	.....	
Returned—tax exempt .....		.....	\$1,494,000	.....	
Returned but taxed .....		.....	306,000	.....	
Capital returned—tax exempt—on the sale basis .....				\$1,800,000	



# Dividends from Depletion or Depreciation Reserves

By R. S. Gayton \*

**DIVIDENDS** paid from depletion or depreciation reserves is a subject which interests individual taxpayers in filing their tax returns. It is the duty of the paying corporations to advise their stockholders relative to the true taxable status of such dividends.

To enable the officials of a corporation to determine whether or not its dividends are nontaxable, there are certain steps which must be taken to establish a base. Some of this procedure, which will be subsequently outlined, may appear rather unnecessary, but it is believed that it is the only satisfactory means by which the bureau and the corporation can agree as to the amount of earnings available for dividends.

In order that a dividend may be paid out of depletion or depreciation reserves, it is necessary that all earnings accumulated subsequent to March 1, 1913, be actually distributed. It is the purpose of this paper to outline some of the various computations and methods by which the taxable status of dividends is determined by the department. The discussion will be confined to a domestic mining company.

The Revenue Act of 1928 and Regulations 74 issued thereunder necessarily form the background of the entire subject.

Section 115 of this act provides:

"(a) Definition of dividend.—The term 'dividend' when used in this title (except in Section 203(a)(4) and Section 208(c)(1), relating to insurance companies), means any distribution made by a corporation to its shareholders, whether in money or other property, out of its earnings or profits accumulated after February 28, 1913.

"(b) Source of distributions.—For the purpose of this act every distribution is made out of earnings or profits to the extent thereof, and from the most recently accumulated earnings or profits. Any earnings or profits accumulated, or increase in value of property accrued, before March 1, 1913, may be distributed exempt from tax, after the earnings and profits accumulated after February 28, 1913, have been distributed, but any such tax-free distribution shall be applied against and reduce the basis of the stock provided in Section 113."

Article 621, Regulations 74, contains this sentence:

\* Bureau of Internal Revenue.

"Although interest on state bonds and certain other obligations is not taxable when received by a corporation, upon amalgamation with the other funds of the corporation such income loses its identity and when distributed to shareholders in dividends is taxable to the same extent as other dividends."

Article 623 contains important material which must be kept in mind, a portion of such article reading:

"Any distribution by a corporation out of earnings or profits accumulated prior to March 1, 1913, or out of increase in value of property accrued prior to March 1, 1913 (whether or not realized by sale or other disposition, and, if realized, whether prior to or on or after March 1, 1913), is not a dividend within the meaning of Title I. A corporation can not distribute earnings or profits accumulated or increase in value of property accrued prior to March 1, 1913, exempt from tax, unless and until all earnings or profits accumulated since February 28, 1913, have been distributed. Whenever one corporation receives from another corporation distributions out of earnings or profits accumulated by such other corporation prior to March 1, 1913, or out of increase in value accrued prior to March 1, 1913, and the 'receiving' corporation, after having first distributed all of its earnings or profits accumulated since February 28, 1913, distributes to its shareholders the amount so received by it from such other corporation, the distribution by the 'receiving' corporation to its shareholders is not a dividend within the meaning of Title I and is exempt from tax.

"In determining whether a dividend is out of earnings or profits accumulated since February 28, 1913, or prior to March 1, 1913, due consideration must be given to the facts, and mere bookkeeping entries increasing or decreasing surplus will not be conclusive."

Article 626, which deals specifically with distributions from depletion or depreciation reserves, must also be quoted in part in order to complete the picture of the legal side of this proposition:

"A reserve set up out of gross income by a corporation and maintained for the purpose of making good any loss of capital assets on account of depletion or depreciation is not a part of surplus out of which ordinary dividends may be paid. \* \* \* No distribution, however, can be made from such a reserve until all the earnings or profits of the corporation have first been distributed."

There are numerous court and United States Board of Tax Appeals decisions and departmental rulings dealing with

this subject which form the basis for the mechanical or accounting side of the problem.

The first step is to determine what the amount of the undistributed earnings accumulated subsequent to March 1, 1913, is at a given date. The company's books, as a rule, are not kept in a manner that will reflect this item because it is of value to stockholders only. Furthermore, it may be good accounting for the corporation to reflect a different amount of depletion and depreciation than is allowed in the audit of the company's returns by the Treasury Department. The starting point for the department, therefore, is the corporation's income tax returns and from these is developed the income available for dividends for each year, 1913 to 1928. In these audited returns we shall find from the department's standpoint that proper allowances have been made for depletion and depreciation. If a company and the department cannot agree to these items and have taken the matter before the courts or the Board of Tax Appeals, it follows that the department must take a similar position in so far as the stockholders of the same company are concerned.

However, for the sake of simplicity, let us assume that the company and the department have agreed as to the proper ore reserves as of March 1, 1913, and that the units of depletion and rates of depreciation have been settled. Proceeding with the determination of income for the first year, it will be recalled that the Revenue Act of 1913 provided for a certain statutory allowance of depletion and that this allowance did not agree with the depletion actually sustained. The proper handling of depletion and depreciation under this act, or in fact, any other act where a statutory allowance for depletion is made, is to adjust taxable income by allowing the amounts actually sustained. In certain years depletion allowance based on discovery value, was limited to 50 percent of the net income from the property from which the discovery was made, and here again, keeping in mind that we are determining earnings available to pay dividends distributed under the Revenue Act of 1928, depletion sustained should be used in lieu of depletion allowed. Adjustment of depletion necessitates revaluing inventories if the inventory contains any element of the allowed depletion. This is true where depletion is based on production and the depletion allowed in the audit of the corporation's income tax returns is different from the depletion sustained.

With taxable income adjusted to reflect sustained depletion, the next adjustment is for Federal income taxes. For the years 1913 to 1916, inclusive, these taxes were an allowable deduction in ar-



living at taxable income, but not an allowable deduction for subsequent years. This entire matter is covered in General Counsel's Memorandum No. 2951, published in Internal Revenue Bulletin (cumulative) VII-1, page 160. This ruling is to the effect that a corporation which keeps its books on a cash receipts and disbursements basis shall deduct income taxes in the year in which such taxes were actually paid, in arriving at income available for dividends. In the case of a company where books are kept on the accrual basis, income taxes are to be deducted from the year's earnings on which such taxes are accrued; i. e., 1920 taxes, including any additional assessments for 1920, should be deducted from 1920 income.

It has been found that these two items, depletion and income taxes, have been the most troublesome to adjust, possibly because of the time which has elapsed and the fact that in 1913, 1914 and 1915, the corporation's records were not kept in sufficient detail.

Other necessary adjustments to taxable income for dividend purposes relate to nontaxable income and unallowable deductions, meaning items of income not taxed under the various revenue acts, and actual expenditures not allowed as a deduction. Under non-taxable income we have such items as United States and municipal bond interest, dividends from other corporations and so on. Dividends, however, are contained in taxable income for the years 1913 to 1917, inclusive, so that no adjustment is necessary for these years. Dividends received from other corporations out of earnings or increase in value accrued prior to March 1, 1913, are covered by Article 621 of Regulations 74, quoted above.

Under unallowable deductions, there appear such expenditures as contributions or donations actually made by the corporation to charitable institutions, colleges and so on, which it is not allowed to take as a deduction in arriving at taxable income. The rules of sound accounting should govern these items—true expenses should come out and true capital expenditures should not. Insurance on officers' lives with the company the beneficiary is, according to many authorities, a pure investment if an endowment and partially so with other types of policies. This item is, of course, considered on its individual merits in each case, together with any other questions of income or deductions which might arise.

When the correct income available for distribution for each year, 1913 to 1928, inclusive, has been determined, the next step is to ascertain how much was available at each dividend date. This is done by prorating each year's income (assum-

ing, of course, that the company closes its books but once a year) up to the date of each dividend payment.

If the pro rata earnings of the company for the period March 1, 1913, to December 31, 1915, were in excess of the dividends paid this excess or deficit would come out of surplus on hand at March 1, 1913, or, if no surplus existed, out of capital. If the company operated at a loss for 1916, this operating deficit would charge against any prior surplus, regardless of how such surplus was created. It is only in those cases where no surplus exists that a true operating deficit would be carried forward to reduce subsequent year's earnings. Under no circumstances would a deficit created by the payment of dividends charge against subsequent year's earnings.

Authority for prorating is found in the decision of the Supreme Court in the case *Edwards vs. Douglas*, 269 U. S. 204. Rules relative to the handling of losses will be found in the decision of the Court of Claims in the case of *Blair vs. United States*, 63 Ct. Cls. 193, and various rulings of the bureau which are assembled and explained in General Counsel's Memorandum No. 3532, published in Cumulative Bulletin VII-1 at page 190. The date of payment of a dividend is held to be the governing date, and not the date of declaration. See *Mason vs. Routzhan*, 275 U. S. 175.

Under the Revenue Act of 1916 as amended by the act of 1917, it was possible for a corporation to specifically declare a distribution out of March 1, 1913 surplus and, therefore, nontaxable in the hands of the stockholders, provided such dividend was specifically declared out of such surplus and paid prior to August 6, 1917. It follows that the 1916 or 1917 earnings should not be reduced by this class of dividends made nontaxable by statute. Subsequent revenue acts do not contain this provision and the actual wording of the declaration of the dividend is immaterial in so far as it affects taxability. If this proration of earnings up to each dividend date is continued up through 1928, the result will be the ascertainment of earnings accumulated subsequent to March 1, 1913, and whether or not any dividends have been paid from any other source. It will be observed that the main problem is the ascertainment and distribution of earnings subsequent to March 1, 1913, for it is not until these earnings are distributed that true nontaxable dividends are paid. Distributions not out of earnings subsequent to March 1, 1913, are paid out of March 1, 1913, surplus and reduce the basic cost of stock on which paid. Under the Revenue Act of 1928 an excess of nontaxable distributions out of March 1, 1913 surplus over basic cost of stock is not taxable, but nontax-

able distributions from any other source, such as depletion or depreciation reserves based on cost and which exceed the basic cost of the stock, are taxable in the hands of the stockholders the same as any other profit. The regulations further amplify these points.

In closing this second and final step it might be added that it has not been the custom of the bureau to consider the day's earnings on which a dividend is paid; therefore, a dividend actually paid on January 15 would have only 14 days' earnings of that year counted as available.

There is one exception to the general rule of prorating each year's income and this is relative to dividends received from other corporations. This income is considered available for distribution when such dividend is actually or constructively paid. This exception often makes a material difference in cases of holding companies.

The issuance of a stock dividend results in no taxable income to the recipient and it is further held that a stock dividend does not distribute nor disturb earnings available to pay ordinary dividends. There are numerous decisions of the Board of Tax Appeals and departmental rulings in support of this theory.

Under the present rulings of the bureau, foreign corporations are entitled to the same privilege of paying nontaxable distributions as are domestic corporations. The problem here is more complex as there are no means by which the income can be verified as no income tax returns are on file. Therefore, the company or its stockholders must go to the expense of preparing detailed statements of profit and loss for every year subsequent to March 1, 1913, the date and amount of each dividend payment, together with the necessary data to establish depletion and depreciation deductions. This involves considerable accounting and engineering work and very often the expense of establishing nontaxable distributions is in excess of the amount of tax involved.

It is hoped that this brief outline of the general methods used by the department in ascertaining the taxable status of corporate distributions to stockholders will serve to clarify any misunderstanding that may perhaps exist relative to the method by which such determinations are made. In any event, I wish to state that the department welcomes conferences with representatives of corporations, as it has been found that by means of such conferences, differences of opinion and controversies with stockholders as to actual facts may be ironed out or eliminated altogether, and it is, above all things, the desire of the department to cooperate with the taxpayers of the United States Government.





## COAL'S Convention and Exposition

**T**HE Seventh Annual Convention and Exposition of Coal Mining Equipment held at Cincinnati, Ohio, May 5-9, brought together the largest number of coal-mining executives, operating officials, engineers and manufacturers of equipment ever assembled at any similar meeting. Great interest was shown in the papers and discussions, as well as in the exhibits, which filled the Music Hall to capacity.

The program of the convention was devoted entirely to subjects covering all phases of operation. The general situation with respect to the present condition of coal was presented at the opening session.



JAMES F. CALLBREATH  
Secretary of the American Mining Congress

G. B. Southward, mechanization engineer of The American Mining Congress, and F. G. Tryon, of the United States Bureau of Mines, presented some interesting information on the growth of mechanized mining. W. H. Rastall, of the United States Department of Commerce; Eli T. Conner, Consulting Engineer, Scranton, Pa.; Howard N. Eavenson, of Eavenson, Alford and Hicks, mining engineers, Pittsburgh; and K. A. Spencer, engineer in charge of engineering, Pittsburgh and Midway Coal Mining Company, Pittsburg, Kans., discussed the present situation in anthracite, strip mining, the mining machinery export market and fuel utilization.

The sessions devoted to mechanized cutting and loading, transportation and maintenance, personnel training, mining thin seams, mechanical loaders and conveyors in high coal, cleaning of coal, accident prevention, and 100 percent mechanical operations were all well attended, and much valuable discussion and

material were developed that will be of great value in promoting the welfare of the coal industry, as well as individual mines or companies who have yet to adopt modern methods of mechanical operations in the mining of coal.

The convention opened Monday, May 5, with Dr. L. E. Young, vice president of the Pittsburgh Coal Company, presiding. G. B. Southward, mechanization engineer of The American Mining Congress, was the first speaker. He submitted data covering 230 mechanized mines located in the principal coal fields of the United States. He summarized the operations of these mines as follows:



P. C. THOMAS  
Pittsburgh, Pa.  
Chairman, Program Committee



L. W. SHUGG  
General Electric Co.  
Director of Exhibits



F. J. MAPLE  
Trenton, N. J.  
Elected Chairman, Manufacturers' Division, The American Mining Congress

*Central Field*  
—74 mines with  
47 mines 90 per-  
cent mechanized.

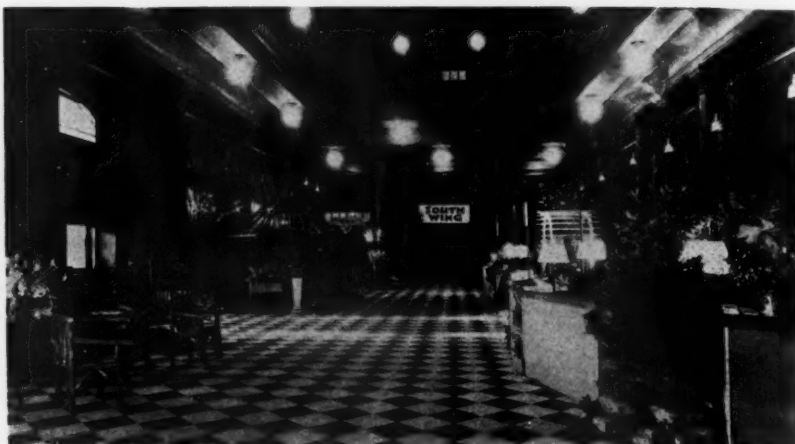
*Northern Ap-  
palachian Field*  
—55 mines with  
7 mines 90 per-  
cent mechanized.

*Southern Ap-  
palachian Field*  
—22 mines with  
2 mines 90 per-  
cent mechanized.

*Southern*  
*Field*—32 mines  
with 20 mines  
90 percent me-  
chanized.

*Rocky Mountain Field*—47 mines with  
11 mines 90 percent mechanized.

Detailed statistics on mechanized mines



were presented by O. S. Kiessling, of the Coal Section of the United States Bureau of Mines. The trend which coal mechanization is following was indicated by a showing of the tonnage increases

made during 1929 by mines that are using mechanical equipment. Mr. Southward said that there may be some question as to what percentage of the mines now using loading equipment are experi-

mental, and what percentage have proven the equipment to be more economical than hand loading.

"It is a safe assumption that a mine which is 100 percent mechanized has proven its economy to the satisfaction of the management. It is equally true that a mine which has mechanized as much as 90 percent of its loading can be considered as successfully proven and definitely committed to complete mechanization. Also it is probable that most mines which are more than 50 percent mechanized are successful," said Mr. Southward.

Eli T. Connor discussed the outstanding developments in the anthracite fields in relation to the use of mechanical equipment. "Developments in Fuel Utilization" was the subject treated by H. N. Eavenson, of Pittsburgh, who said that "there is a gradual trend toward the use of coal in some other than its original state. The new uses in sight will hardly more than balance the savings being made by more efficient use, if it will. The coal industry should encourage the installation of more convenient methods of house heating. Finally, statistics regarding the distribution and use of coal





employment of this equipment will lead to the most interesting consequences among our neighbors to the south." He referred to the growing use of machinery in European countries, particularly England, Germany and France. "Comparatively speaking," said Mr. Rastall, "the applications of machinery to mining have come in relatively recent years, and in



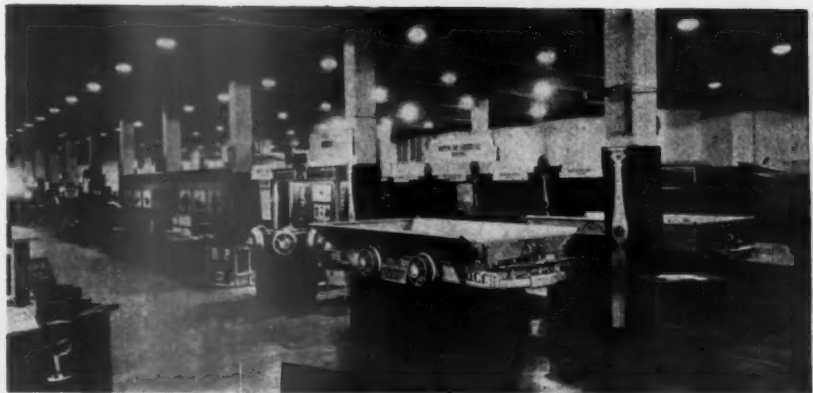
C. L. HESTER  
Penn., Pa.

Retiring Chairman, Manufacturers' Division, The American Mining Congress

in various forms, industries, and localities are scarce, and some national organization should collect these for the benefit of the coal industry."

Coal companies engaged in strip mining produced 4 percent of the total bituminous tonnage in 1929. K. A. Spencer, of the Pittsburg and Midway Coal Mining Company, Pittsburg, Kans., reviewed the developments in strip mining in the United States. He said that probably the most important problem in that branch of the coal industry is the installation of new mines in territories which are now over equipped and are producing coal in excess of the requirements of the trade territory served.

The session ended with a paper by W. H. Rastall, chief of the Industrial Machinery Division of the Department of Commerce, who outlined the international situation with respect to the use of machinery in the mining of coal. He said that "machinery is recognized as a factor that exerts most powerful influences on the economic situation. Asia has absorbed a billion dollars worth of industrial machinery since the Armistice, and it is interesting to speculate upon the consequences that will flow



from the employment of this huge volume of equipment among those teeming populations during the next few years. Similarly, Latin America has absorbed \$750,000,000 worth of machinery since the war, and although conditions there are very different from those that apply in Asia, it may still be said that the

greater degree in American circles than elsewhere. In the coal industry of Great Britain, for instance, only 8½ percent of the total production was cut by machinery in 1913, a ratio that by 1929 had increased to 27.9 percent—figures which are not representative of certain areas, however.





"Last year American coal cutters were imported to 16 foreign countries in every section of the world, even Australia, New Zealand, Chile and Japan being represented."

#### CUTTING AND LOADING

At the session on Mechanized Mining, which opened Tuesday morning with R. L. Ireland, Jr., manager, Bituminous Mines, M. A. Hanna Company, presiding, the first address which covered "Coal Cutting with Track Machines and General Face Preparations," was made by George F. Campbell, general manager, Old Ben Coal Corporation, who

described the value of the "track mounted under-cutter," a new arrival in mining machinery. With charts Mr. Campbell showed the use and method of operation of this machine in mines in Southern Illinois, and pointed out the radical departures in undercutting operations it has brought about.

Discussing "Gathering Methods Developed for Mechanized Loading," R. J. Oldham, superintendent of the Centralia Coal Company, of Centralia, Ill., described the system developed and used for gathering coal loaded by Joy machines at one of his company's mines, and told of the advantages of the method as made apparent by taking time studies of loading operations. Of these advantages he pointed out the following as outstanding: 1. The time consumed in changing car is reduced to a minimum. 2. A minimum number of men per switching crew is needed.

Comparing the mine in the old days of "mule power" with the mechanically powered mine of today, Carl Lee, electrical engineer of the Peabody Coal Company, of Chicago, in a paper on "Power in Mechanical Mining" described the



C. W. GISS  
Pittsburgh, Pa.



H. N. EAVENSON  
Pittsburgh, Pa.



K. A. SPENCER  
Pittsburg, Kans.

"In Germany in 1914 only one-half of 1 percent of the coal was mined mechanically, but by 1926 this had increased to 50.4 percent.

"Similar forces are at work in France, where about 64 percent of the total French production comes from the fields in the Nord and Pas-de-Calais. In the latter district 65 percent of the product was mechanically mined in 1927 as contrasted with 4.7 percent in 1913.

"More recently Russia has developed keen interest in coal

mining equipment, and during the years 1926, 1927, and 1928 imported nearly three-quarters of a million dollars worth of American coal cutters.



HAROLD HUTCHINSON  
Logan, W. Va.



FRED E. BOSS  
Indiana, Pa.



JOHN A. GARCIA  
Chicago, Ill.



W. L. HENRY  
Lynch, Ky.





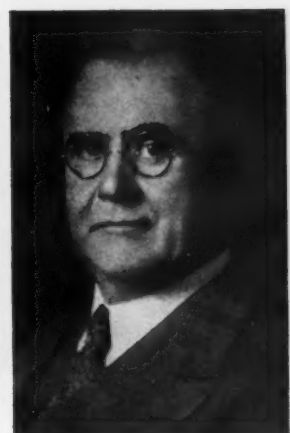
Dr. L. E. Young



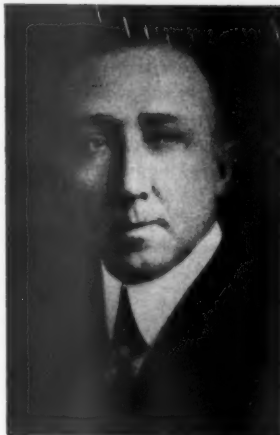
Milton Fies



A. J. Musser



W. J. Jenkins



C. W. Gibbs



D. D. Dodge



F. R. Lyon

#### CHAIRMEN OF SESSIONS OF THE CONVENTION

modern mine where practically all work previously done by man or animal power has been taken over by electrically-driven devices and showed the vastly improved efficiency brought about by mechanization. He showed what changes mechanization has produced in operations inside the mine and traced the newest and most recent developments in loading machinery. "Mechanical loading with the auxiliaries required will increase the power load inside the mine by

possibly 50 percent over hand loading," he said.

#### COST DATA VITAL

"The Use of Graphic Cost Charts in Mechanized Loading" was discussed by W. L. Affelder, vice president of the Hillman Coal and Coke Company, of Pittsburgh, who used as the basis of his address the system of keeping costs of

operation in use by his company for more than seven years. "It would be an almost hopeless task to endeavor to follow the detailed cost data of a large num-

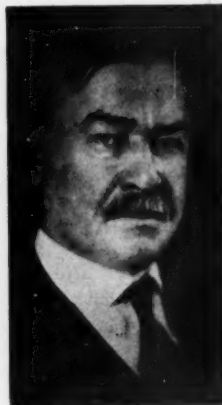
Dr. Lewis E. Young  
Pittsburgh, Pa.R. E. Taggart  
Philadelphia, Pa.B. E. SCHONTHAL  
Chicago, Ill.E. D. FORTNEY  
Fairmont, W. Va.W. J. BAILLIE  
McDonald, Pa.J. D. DAVIDSON  
West Virginia



George F. Campbell



A. S. Wilson



Dr. J. J. Rutledge



J. W. Bischoff



R. M. Lambie

### SPEAKERS AT THE CONVENTION



R. L. Hair

ber of mechanical units from actual figures," said Mr. Affelder. "On the other hand it would be folly to operate any mine, either wholly or partially on a mechanical basis, without having sufficiently itemized cost data in such shape that the figures can be interpreted easily and quickly by a mining man of ordinary intelligence. \* \* \* No Graphic Cost System is applicable to the



Edward Bottomley

problems of all mines, but some system should certainly be used in every mechanized mine whereby the executives and minor officials can interpret



W. H. Rastall

costs quickly and accurately." G. G. Kanable, chief electrical engineer of the Rochester and Pittsburgh Coal Company, presented the first paper at the Tuesday afternoon session on Transportation and Main-

tenance which was presided over by F. R. Lyon, vice president of the Consolidation Coal Company. Discussing "Large Locomotives in Long Haulage" Mr. Kanable reviewed the haulage question from every angle, described the newest and latest developments in haulage equipment and showed the advantages and economies of the large against the small locomotive in certain



M. D. Cooper



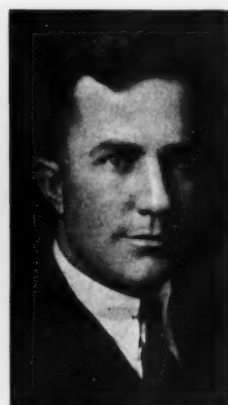
Earl H. McAlpine



Charles Enzian



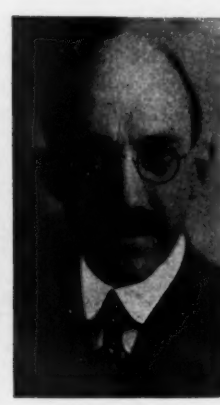
E. J. Christy



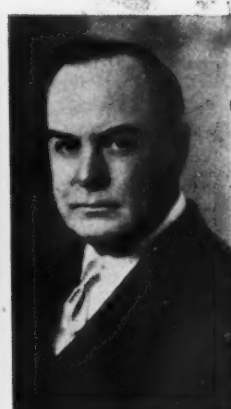
S. W. Blakslee



D. L. Boyle



E. A. Holbrook

*T. J. Thomas**William Roy**W. S. Rausch**R. E. Rightmire**Gomer Reese*

types of haulage problems, illustrating his talk with a valuable table showing locomotive weights and conditions under which they are operated. "Today, the average mining company finds itself with expensive tipples and cleaning plants made necessary by demands of the consumer for clean coal, and as it is out of the question to move the plant to the coal, it has become necessary to move the

coal to the plant; the result of this being that many of these companies have conditions in which the cars are switched several times, and handled by several locomotives before reach-

### **SPEAKERS AT THE CONVENTION**

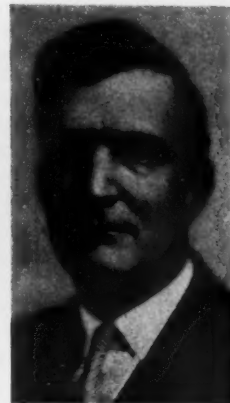
*Alden F. Castanoli**K. A. Spencer**W. H. Stewart*

ing the tipple," said Mr. Kanable, pointing out the solution of this problem which lies in the large locomotive.

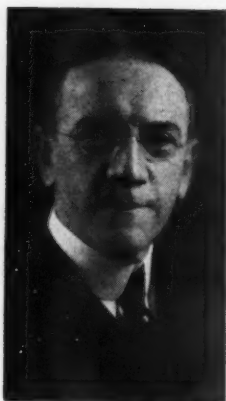
"The one single feature of a mine car that may affect costs more than all other

*T. E. Lightfoot**Eli T. Conner*

items combined is capacity," F. S. Follansbee, chief engineer of the Koppers Coal Company, Inc., of Pittsburgh, stated in a paper on "Increasing the Capacity of Mine Cars." He then described various types of cars and machinery which enable the operator to increase this capacity, besides outlining practical loading methods tending toward greater efficiency. "In selecting

*Fred L. Stone**A. C. Callen**F. G. Tryon**James A. Long**F. W. Whiteside*





Howard N. Eavenson



Herbert B. Husband



C. R. Stahl



C. A. McDowell



Charles M. Means

### SPEAKERS AT THE CONVENTION

a new mine car, capacity should be given first consideration," he said.

Anthracyte Stripping and Transportation was discussed by W. S. Rausch, mining engineer, of the Lehigh Navigation Coal Company, of Lansford, Pa. "The economical problem of producing the largest quantity of coal for the least expenditure is the fundamental reason for employment of stripping methods," he said. "Generally speaking, stripping coal is produced more cheaply and a higher recovery made than by general mining operations, especially since modern equipment has been installed." Among the factors in stripping operations discussed by Mr. Rausch, were selection and type of shovels and the number to be used; electric versus steam shovels; drilling; blasting and narrow gauge stripping. "The answer to the transportation problem at modern



G. B. Southward

strippings is mainly one of using the larger type cars, either narrow or standard gauge, with engines of sufficient power to pull heavy loads at average speeds rather than small loads at high speeds," he said.

At this session was also shown the moving picture of "Wildwood—a 100 Percent Mechanized Mine." The film was described by W. P. Vance, chief engineer and general superintendent, Butler Consolidated Coal Company, and was made by the Westinghouse Electric & Manufacturing Company. This film was shown three times during the convention: Monday night to the members of the National Committee on Mechanized Mining; Tuesday afternoon during the Transportation and Maintenance session; and on Friday, at the 100 percent Mechanical Mining Session. It was a startling feature of the program and created a vast amount of interest.

A number of moving pictures were shown during the convention, including Anthracite Strip

Mining, in conjunction with the paper by Mr. Rausch, a mechanical loading operation, shown with the paper by T. J. Thomas, president, Valier Coal Company, and Cleaning Strip Coal shown with the paper by Wm. H. Stewart, of the Central Indiana Coal Company.

### PERSONNEL TRAINING

A session of outstanding importance was the session

T. R. JOHNS  
Johnstown, Pa.W. S. RAUSCH  
Lansford, Pa.J. L. DAVIDSON  
Alabama

on Personnel Training which opened Wednesday morning with Milton H. Fies, vice president in charge of operations of the De Bardeleben Coal Corporation, of Birmingham, Ala., presiding as chairman. Many important problems in the training of men under the new conditions brought about by mechanization were fully discussed at this session and much valuable information was presented for consideration. The first paper and one of particular significance to the industry, was presented by Dr. J. J. Rutledge, chief mine engineer of the Maryland Bureau of Mines, and dealt with "Vocational Training Among Coal Mine Employees." Dr. Rutledge discussed the progress of the work in training men for mining operations being accomplished by night mining classes in the bituminous fields of western Pennsylvania, in the anthracite fields of northeastern Pennsylvania, in West Virginia, Illinois, Kansas and Oklahoma, in addition to those of his own state. He then brought out the matter of fees, instruction, subjects taught in the night classes, promotions as a result of night class work, a summer short course in mining and the future of the work. "It is necessary that mine foremen and fire bosses receive

training in mine safety and mine management," said Dr. Rutledge. "Not only should the mine foremen, superintendents and fire bosses have had practical experience at the working face but they should, in addition to this experience,



A. W. DICKINSON, of the American Mining Congress, talks over old times with EUGENE MCAULIFFE, of Omaha, Nebr.





F. S. Follansbee



Dr. H. E. Nold



Charles Gottschalk



R. J. Oldham



R. L. Kingsland

receive training in the proper way to handle labor, how to meet adverse mining conditions, and how to operate a coal mine safely and efficiently."

"Training Men at the Face" was the subject of a paper presented by F. E. Bedale, engineer of safety, of the Consolidation Coal Company, of Fairmont, W. Va., which analyzed the various problems of the education of the working man at the face and showed how the elimination of dangerous or otherwise objectionable conditions might be accomplished. "Briefly put," said Mr. Bedale, "the education of the man at the face generally covers health, safety, scientific methods of working, and the better preparation of the final product." He then outlined in full a thorough course of training emphasizing the value of safety standards and rules. But, he pointed out, "without executive recognition and aid, the whole structure topples to ruin; with full cooperation there is no limit to the high point of success which may be reached."

Gomer Reese, general superintendent of the Kemmerer Coal Co., of Kemmerer, Wyo., then presented a paper on "Developing Bosses and Coaching Men" in which he said: "In developing bosses and coaching men, it is not only a matter of training the men who are on the job at present but it is vitally important that we put forth every effort to give the future miner every opportunity to get every bit of education available

VLADIMIR BILENKO  
Moscow  
Russia's Mining ChiefREUBEN M. LEYBOV  
Kharkov, RussiaED. BOTTOMLEY  
Sheridan, Wyo.

session on Mechanized Mining (in high coal) which opened Thursday morning. A paper on "Development and Operation With Mechanical Loaders in Illinois" was presented by T. J. Thomas, president of the Valier Coal Company, of

#### SPEAKERS AT THE CONVENTION

to fit him for the work he is to carry on." Mr. Reese described the vocational training in practice in the State of Wyoming and discussed various educational methods pointing out the value and advantages of each.

#### THIN SEAM OPERATIONS

D. D. Dodge, general superintendent of W. J. Rainey, Inc., presided over the Wednesday afternoon session on Mechanized Mining in Thin Seam Operations, and John H. Richards, chief mining engineer of the Wheeling and Lake Erie Coal Mining Company presented the first paper. His subject "Entry Development With Conveyors" covered operations in the mines of his company, and with charts and diagrams he illustrated the efficiency of modern duckbill loaders and conveyors.

George J. Krebs, superintendent of the Reading Iron Company, discussed "Conveyors in Room and Pillar Operations" at his company discussing in detail the various systems used and tracing the progress of mechanization in these operations at the company's mines, and the gradual increase in production efficiency from year to year.

"Long Face and Long Wall Mining Methods" was discussed in a paper by Earl H. McAlpine, mining engineer, of Haileyville, Okla., who outlined four methods in practice in Oklahoma fields. Two of these methods are in use in mines which are comparatively level. The first of these is in the Kali-Inla mine near Hartshorne. The second is in the Milby-Dow Coal Company at Dow. The Mullen Coal Company, near McAlester, and the Hailey-Ola Company mine, near Lutie, are steep pitching mines.

#### EFFICIENCY IN MECHANIZATION

W. J. Jenkins, vice president and general manager of the Consolidated Coal Company, of St. Louis, was chairman of the session on Mechanized Mining (in high coal) which opened Thursday morning. A paper on "Development and Operation With Mechanical Loaders in Illinois" was presented by T. J. Thomas, president of the Valier Coal Company, of



W. L. Affelder



C. E. Lawall



E. J. NEWBERRY of Windber, Pa., follows in his father's footsteps





Chicago, Ill., who traced the progress of the mechanization program of his company from its inception to the present day and listed a few of the outstanding methods and facilities recommended by their laboratory when studies were made to bring about greater efficiency. These included: (1) Increased tractive power and the purchase of improved locomotives where necessary to replace those retired. (2) Conversion of locomotives from saturated to superheated steam. (3) Water treatment. (4) Improved method of hand firing. (5) Grates of improved design and increased area. (6) Feed water heaters. (7) Increased standards of maintenance. (8) Automatic fire doors. (9) Automatic stokers. (10) Automatic signals. (11) Grade reductions.

"Four Years of Mechanical Loading in Southern West Virginia," was the sub-

ject of a paper prepared by Herbert B. Husband, general manager, Fuel Mine Operations, Chesapeake and Ohio Railway Company, and read by L. E. Grant, mine superintendent of the railway company. Time study is gradually eliminating operation losses, Mr. Husband pointed out, declaring "as inefficient as we know we are, the cost savings are tremendous and the far reaching effect of the thousands of feet of entry driven in short periods, allowing concentrated working areas, has had on our mines on the whole, can not well be estimated in concrete figures.

F. W. Whiteside, chief engineer of the



PAUL WEIR  
Centralia, Ill.



W. P. VANCE  
Butler, Pa.



P. O. EMORY  
Johnstown, Pa.



W. M. ZEIGLER  
Indiana, Pa.

Victor-American Fuel Company, of Denver, Colo., then discussed "Operation With Conveyors," explaining that while accurate cost data is not available, results so far obtained from conveyors designed and made by the company would amount to a saving from 25 to 50 cents a ton. The problem of moving coal from the mine working face to the pit car and thence to the tippie, he pointed out, is one to which his company has devoted a considerable amount of time, money and experiment. "While I think I can truly state," he said, "that we have made a certain amount of progress, there are, no doubt, many features of the problem which are still unsolved."

In a paper on "Mechanical Loading in Anthracite Mining" Sheldon Jones, effi-

ciency engineer of the Lehigh Valley Coal Company, of Wilkes-Barre, Pa., stated that the advancement of mechanical loading in tunnel work has made more progress than other lines of refuse and rock loading. "A number of very large tunnel jobs in the anthracite field are now 100 percent mechanical loaded," he said. "The advantage of the conveyor loader over hand loading is principally due to being able to handle large pieces of rock, as made in blasting, up to one ton."

#### COAL CLEANING

The business of the Thursday afternoon session centered in discussions of cleaning coal. R. E. Taggart, vice president of the Stonega Coke and Coal Company, presided.

W. E. Tissue, assistant sales manager of the White Oak Coal Company, of McDonald, W. Va., presented a paper in which he described the methods of preparation at his company. "The coal-buying public today is no longer satisfied with the preparation of yesterday because coal is being offered today from more modern plants, each specializing in some feature of sizing, cleaning, or other



ELI T. CONNER  
Scranton, Pa.



CARL LEE  
Chicago

form of preparation. These modern plants are the answer of the smokeless operator to the ever increasing demand for a better prepared fuel," he said, concluding that "appearance is being recognized as a determining factor in the sale of coal as fuel." The coal producer must keep in close touch with all developments in preparation in order to meet increased competition, he pointed out.

Next followed a paper on "Cleaning Strip Mined Coal," by William H. Stewart, general superintendent of the Central Indiana Coal Company, of Linton, Ind. He showed how the idea of quality and the application of new practices and equipment has resulted in increased running time for his company's mines, and gave two reasons for a preparation plant: (1) To make a poor coal salable and where the cost of operation is merely added to the actual market price of raw coal. (2) To make a good coal



L. B. ABBOTT  
Jenkins, Ky.



W. J. KEARNS  
Jones & Laughlin Steel Corp.

MANY POINTS WERE WELL TAKEN

better and where the added realization will show a profit on the investment.

"Cleaning Coal at the Consolidation Coal Company," was described by Robert Rightmire, engineer of tests, of the Consolidation Coal Company, at Fairmont, W. Va., who declared that "control of plant operation is of prime importance in maintaining the desired standard of product and maximum efficiency in operation" and showed the various ways in which this could be accomplished including the taking of frequent float and sink tests of the various products and ash analyses of these products; the taking of representative samples of the products at frequent intervals, and observation of railroad car loading to make certain that size requirements are met when making run-of-mine shipments.

In a paper on "Cleaning Anthracite Coal," Paul Sterling, mechanical engineer of the Lehigh Valley Coal Corporation, forecasted the possibility of automatic coal preparation in the future which he said should be an ambition of the industry, but added "for today, let us satisfy our critical trade with 'quality anthracite' and educate them so that they may appreciate the economies gained



E. F. AUSTIN  
Pittsburgh, Pa.

FRED NORMAN  
Kittanning, Pa.

in using 'quality combustibles' which means lowering cost and greater efficiency." He advocated the establishment of a central test laboratory where "ideas could be pooled and developed for the use of all" in order to accomplish results and avoid duplication of effort.

Alder F. Castanoli, engineer in charge of preparation, of the Houston Collieries Company, of Wilkes-Barre, Pa., next presented a paper on "Cleaning Coal at the Carswell Plant" of his company, and the session was brought to a close with a paper on "Cleaning West Virginia Coal," by R. H. Kelley, of the Greenbrier Coal and Coke Company, of Bromwell, W. Va.

## SAFETY AND MECHANIZATION

Important measures in mine safety were considered at the Friday morning session on Accident Prevention, presided over by A. J. Musser, vice president of the Clearfield Bituminous Coal Corporation. "Methods Employed In Developing, Maintaining and Enforcing Safety"



was the subject of the first paper presented by A. S. Wilson, general superintendent of the Boone County Coal Corporation, who based his outline on the various safety methods employed on extensive correspondence with a number of representative coal companies, and in his consideration of the development of a safety code, discussed the following factors: Labor Intelligence; Labor Turn-

cluded therein. Mechanization is calling for closer and more intelligent supervision by foremen in charge; and operators will only pay for the use of that part of the body from the chin up, rather than from the chin down."

"The Relation of Mechanical Mining to Safety" was then discussed in a paper by A. W. Dickinson, mining engineer of the American Mining Congress. "The trend of the industry points toward an increasing tonnage loaded by machines," said Mr. Dickinson. "*First*, because more coal can be loaded per man; *Second*, because men in this day do not take up the work of loading coal with a hand



W. K. KAVANAUGH  
St. Louis, Mo.

CHARLES ENZIAN  
Fairmont, W. Va.

over, Union and Non Union Operation; Compensation by Company or State; Group Insurance; Mechanization; Maintenance, Safety Suggestions; Bulletin Service; Safety Meetings; Safety Police or Committee; Safety Court; Monthly Bulletins; Motion Picture Films; Monthly Inspections; First-Aid Training; Intercompany and State First-Aid Meets; Safety Certificates or Merit Badge and Enforcement. "The change from hand loading to mechanical loading, which is making such rapid strides throughout the country," he said, "will require changes in present safety rules. The details will have to be worked out as experience dictates, but it is certain that a rigid system of electrical inspection will be in-



H. W. SMITH  
New York City

RALPH W. PALMER  
Pittsburgh, Pa.

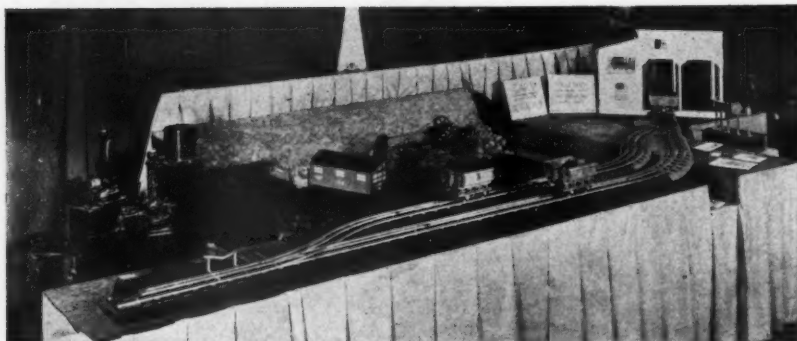


FREDERICK P. BAYLES  
Cincinnati, Ohio

W. F. DAYTON

AND HERE'S A PRETTY "HOWDY DO"



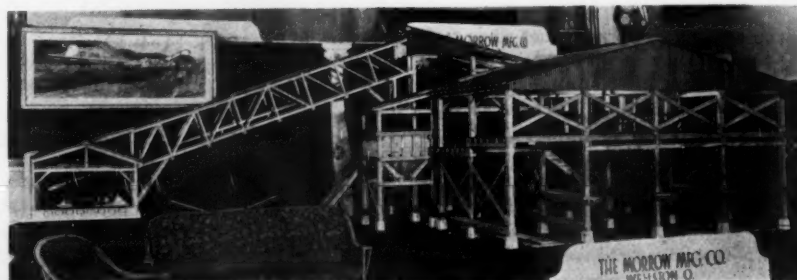
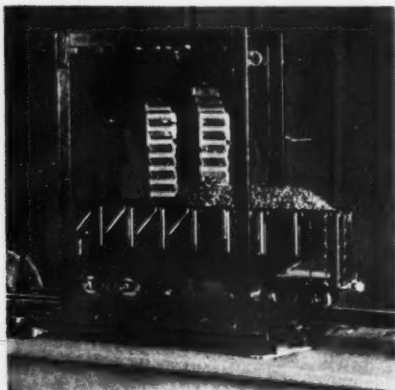


shovel from choice or preference. There is still another reason which makes for a preference for mechanical mining, properly conducted, and that is the increasing conviction that it is accompanied by less killing and maiming of men." Mr. Dickinson described various phases of mechanical mining and showed how and where increased safety could be brought about.

T. E. Lightfoot, engineer in charge of



Accident Prevention and Compensation of the Koppers Coal Company, Inc., in a paper on "Physical Examination in Relation to Accident Prevention," showed the value of establishing the fitness of men to work by regular examinations, and stated that some companies have maintained physical examinations for the past 15 years, and that since 1925 the



Harwick Coal and Coke Company. Two important papers were presented at this session, "A 100 Percent Pit Car Loader Operation," by F. S. Pfahler, vice president and general manager of the Superior Coal Company, of Gillespie, Ill., and "A 100 Percent Scraper Operation," by C. R. Stahl, division superintendent of the C. C. B. Smokeless Coal Company. Mr. Pfahler described loading operations at his company's mines in minute detail and discussed the relative advantages of pit-car loaders over other types of mechanical loaders, stating that in mines 1 and 4 of the company 1,786,797 tons of coal were produced in 1929, all of



number of coal companies employing these examinations has steadily increased. He pointed out a two-fold purpose of these examinations which in addition to enhancing accident prevention work make for increased efficiency by eliminating physically unsound men.

**A GROUP OF INTERESTING EXHIBITS AT THE EXPOSITION ARE SHOWN ON THESE PAGES**

which was loaded with pit-car loaders, and that the company is now installing the same type of loader in mine No. 2. Mr. Stahl described the method of the mechanical scraper operation and gave statistics to prove its added efficiency over hand methods.

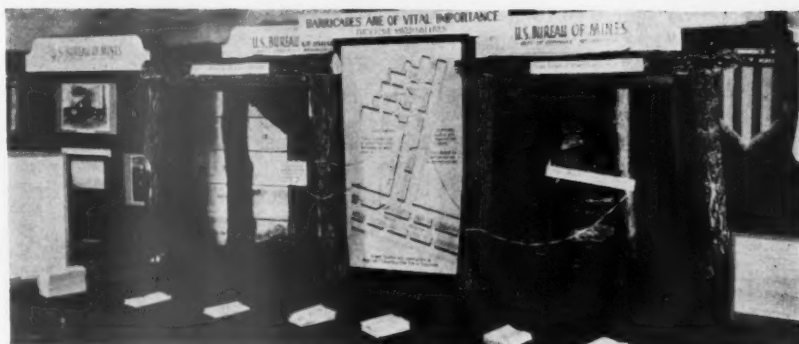
The Standard Coal Company of Wheatland, Ind., closed its mine on May 8 and brought every employe, with



the exception of two pumpers, to Cincinnati to see the exposition and hear the lectures of personnel training and mechanized mining. Supt. J. E. Skinner was in charge of the party consisting of 100 men who arrived in Cincinnati by special train. The entire party was entertained by Walter M. Dake, of the Joy Manufacturing Company, Franklin, Pa. This company holds the production record for the United States. Average coal production in the entire country is 4.7 per "total employee," a term which is used in describing an average production, taking into consideration office men, salesmen and executives. The average of this mine is 16 tons per "total employee."

A special feature of the convention was the Dixie breakfast given by The American Mining Congress in honor of Mr. P. C. Thomas, chairman of the Program Committee. About 100 operators attended the breakfast, which was unique in every detail. Guests were received by an old colored butler; the breakfast was served by colored waiters in overalls and bandanas; an old negro mammy served hot biscuits and cornbread; a pickaninny gave out the souvenirs, which were miniature flashlights; special entertainment was provided by the Sunrise Quartette.

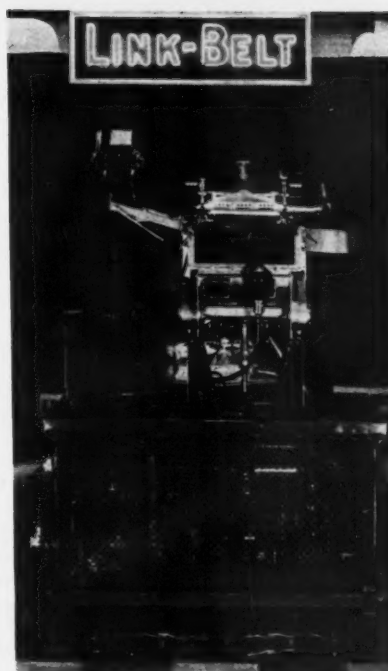
Mr. J. L. Davidson, of the Alabama Coal Mining Institute, proved a real delight as official host at the breakfast. He told a number of his famous stories, in his inimitable manner, and gave his "toast to coal," which appears in full in this issue. Mr. Thomas was presented with a mammoth flashlight, the largest of its kind manufactured.



#### OTHER CONVENTION FEATURES

One of the largest gatherings of delegates at the convention was on Wednesday night, May 7, to witness "Our Gang," a home talent show staged in the ballroom of the Gibson Hotel by exhibitors and delegates. The audience was kept in constant laughter by fellow delegates, who performed in various acts, featuring dancing, songs and comedy, including dialect monologues that scored heavily in the applause. W. D. Turnbull, of the Westinghouse Electric and Manufacturing Company, was chairman of arrangements.

On Monday evening at The American Mining Congress annual party a motion picture was shown of the Wildwood mechanized mine at Butler, Pa., where the entire operation is performed by machinery. The coal is drilled, undercut, blown down, picked up by the conveyor loader, and removed from the mine by machinery. This excellent picture was again shown Tuesday at the afternoon session in connection with the address of W. P. Vance, general superintendent of the Butler Consolidated Coal Company,



on a "100 Percent Mechanical Loading Operation. Loaders, weighing 32 tons, move on railroad tracks into the mine and to the face of the coal seam. Holes automatically are drilled into the seam. By pressing a button the coal is dynamited and broken loose. The steel arms of the machine seize the coal and carry it to cars and locomotives pull the loaded cars to the tipples outside, where the cars are dumped by machinery and the coal is sorted and cleaned by machinery.

The Annual Dinner and Night Club Revue on Thursday evening began with a "speechless" banquet. Leaders of the coal industry assembled at the "speakers'" table responded with merely a bow to their introductions by J. D. Zook, president of the Illinois Coal Operators' Labor Association, Chicago, who served as toastmaster. The after-dinner session was turned over to H. D. Williamson, of Cincinnati, who presented his night club revue. A moving picture of the convention, showing the arrival of officials and delegates and scenes at the Music Hall were then shown.



**THE SAFETY AWARDS**  
The Sentinels of Safety Bronze Trophy was awarded at the morning session, May 9, to the DeBardeleben Coal Corporation of Birmingham, Ala., for the best showing in the National Safety



M. H. DETWEILER  
Zeigler, Ill.



E. WOODSON  
Consolidated  
Coal Company

Competition among bituminous coal-mining companies. This trophy is one of five offered by the *Explosives Engineer*, of Wilmington, Del. More than 30,000,000 man-hours of work were represented in this competition in 1929.

The anthracite trophy was won by Highland No. 6 mine of the Jeddo-Highland Coal Company, Hazleton, Pa., which won this trophy last year.

The Joseph A. Holmes Safety Certificate was awarded to the Sheridan, Wyo., Coal Company for its success in

accident prevention. The presentation was made by J. J. Forbes, of the United States Bureau of Mines.

Other features of the convention were a meeting of the Board of Governors of the Southern Division of The American Mining Congress on May 8 and a dinner conference on Mining Engineering Education. It was the conclusion of those assembled at this dinner conference that the coal industry must offer more inducements to young mining engineers just out of college and make the work to which they are assigned at the outset more attractive to them. Dean E. A.



J. D. ZOOK  
Toastmaster at the  
Annual Banquet



W. D. TURNBULL  
Pittsburgh  
Stage Director  
"Our Gang"





CHAS. C. WHALEY  
First Vice Chairman



RALPH C. BECKER  
Second Vice Chairman



J. T. RYAN  
Third Vice Chairman



F. J. MAPLE  
Newly elected officers and members of the Board of Governors  
John A. Roebling's Sons Company, elected Chairman of the Board of Governors of the Manufacturers' Division, The American Mining Congress



Raymond Mancha



C. B. Officer



L. W. Shugg

Holbrook, of the University of Pittsburgh, presided at this conference. Among those who participated in the discussion were M. D. Cooper, of the Hillman Coal and Coke Company; Prof. Wm. R. Chedsey, of the Department of Mines, Penn State College; R. Dawson Hall, engineering editor of *Coal Age*; Prof. H. E. Nold, Ohio State University; Dean Edward Steidle, Penn State College; Chas. Enzian, chief engineer of the Consolidation Coal Company, Fairmont, W. Va.; Eugene McAuliffe, president of the Union Pacific Coal Company, Omaha, Nebr.; Dr. J. J. Rutledge, chief of the Maryland State Bureau of Mines, Baltimore, Md.; Prof. A. C. Callan, University of Illinois; John D. Battle, National Coal Association, Washington, D. C.; Prof. C. E. Lawall, West Virginia University, Morgantown, W. Va.; N. S. Greensfelder, Hercules Powder Company, Wilmington, Del.; Dr.



J. A. MALADY  
Pittsburgh, Pa.

Henry Mace Payne, consulting engineer, American Mining Congress, Washington, D. C.; J. F. Callbreath, secretary, American Mining Congress, Washington, D. C.

Capt. R. M. Watt, Pineville, Ky., chairman of the Southern Division's Board of Governors, presided at the ses-



A. L. VOIGHT  
Danville, Ill.



J. A. SAXE  
Ellsworth, Pa.

sion of the board, which was held in the Gibson Hotel. Captain Watt stressed the need for coordination of southern industrial cooperation and discussed the keynote address of Governor Bibb Graves, of Alabama, on this subject at the March meeting of the Southern Industrial Conference held in Little Rock, Ark. Other



J. C. WILSON  
Mansfield, Ohio



C. A. MCINTYRE  
Scottsdale, Pa.

speakers at this meeting were John L. Wilkes, Jacksonville, Fla.; Dr. Charles L. Baker, Houston, Tex.; and R. F. Monsalvatge, Atlanta, Ga., all members of the Board of Governors. Mr. Wilkes said that at the present time all the governors of the several Southern States are groping for plans to improve industrial conditions in their states, and will welcome a plan for cohesive organization for promoting the development of southern mineral resources and other southern industries. Dr. Baker said that many things can and will be done by the South as a whole which could not be



done by the individual states alone, and Mr. Monsalvatge, after reviewing the growth of Georgia's industries, expressed the opinion that industrial development of mineral resources and establishment of new industries in the South, not only would create new markets for coal but would be a vital factor in the prosperity of the entire country.

Much comment was heard concerning the decorations of the lobby. This beautiful effect was arranged by A. L. Heger, local Cincinnati florist, and was a bower of trees, flowers and shrubs. These trees and flowers were all properly protected, and out of a total of more than 500 trees utilized, only a dozen were killed.

Arrangements for the convention and the exposition were in the hands of E. R. Coombes, assistant to the secretary of The American Mining Congress, and for the past several years secretary of the Program Committee, and L. W. Shugg, of The General Electric Company, who was director of exhibits.

The Program Committee, headed by Mr. P. C. Thomas, Koppers Coal Company, and the Manufacturers' Division, headed by C. L. Herbster, of The Hockensmith Wheel and Mine Car Company, worked untiringly in the development of this great convention and exposition. A special vote of thanks was given to them, and to the companies and individuals who participated in the program.

The city of Cincinnati, official host to the convention, through its Convention

Bureau, in charge of Miss Amy Pace, cooperated whole-heartedly with the committees, and did everything possible for the comfort and happiness of the delegates.

Special entertainment was arranged for the visiting ladies, of whom there were considerably more this year than formerly. The golf clubs were open to them, a special trip to Rookwood potteries was made, and a luncheon tendered them at Mariemont, an interesting suburb of Cincinnati.

These conventions and expositions are of great educational value not alone to the operator but to the young men who are looking forward to positions of responsibility in the industry. Each year has seen a growing interest, a larger attendance, and a greater program and exhibit. A real institution, these Cincinnati meetings, and the committee voted to return to that city in May, 1931.

#### THE EXPOSITION

The exposition, which was described in detail in our May issue, was the "greatest of them all"—largest in size, in importance, in caliber of material exhibited. A great, noisy, magnificent display of the industry's latest recommendations to an harassed industry in cost reduction through the application of mechanization.

Some 127 companies, manufacturers of mining machinery, equipment and supplies, occupied to overflowing both the north and south wings of old Music Hall. The percentage of operating exhibits was materially increased, as evidenced by the current utilized. Just twice the amount of current was used this year, as against the 1929 show. Of the 127 exhibitors, 75 percent are "regulars," having shown their equipment each year for seven successive years. Seventeen of the companies exhibiting were first-timers. Members of the Manufacturers' Division of The American Mining Congress, of which there are 46 members, and under whose auspices these annual events are given, were well represented on the floor.

F. J. Maple, of the John A. Roebling's Sons Company, was elected chairman for the ensuing year, and has pledged his active participation and a bigger and better convention and exposition in 1931. The following were elected to the Board of Governors: Raymond Mancha, Mancha Storage Battery

Company; W. B. Pritchard, Bethlehem Steel Corporation; E. A. Williford, National Carbon Company; C. B. Officer, Sullivan Machinery Company; and L. W. Shugg, General Electric Company. These gentlemen replace H. A. Buzby, Keystone Lubricating Company, former chairman of the division and now honorary chairman; N. S. Greensfelder, Hercules Powder Company, first chairman of the division and now an honorary chairman; H. K. Porter, Hyatt Roller Bearing Company; and J. C. Wilson, Ohio Brass Company. The last two named are also honorary chairman of the division, each having served in the capacity of national chairman.

#### INTERESTING EXHIBITS AT CINCINNATI

One of the interesting features of the Cincinnati Exposition was the unusually large number of beautifully designed working models. Among these was that of a strip mine shown by the Bucyrus-Erie Company and the Woodford Engineering Company. A small electric shovel was operated by actual full-size controls, digging and dumping coal into small cars, which were handled entirely by miniature control similar to those shown through the windows of the tiny tippie, and through these controls alone cars were started, stopped, backed and emptied.

Hydrotator Company exhibited a small model of a new dry sand-cleaning process showing sand practically suspended in air.

Link-Belt Company's exhibit included a model of the Link-Belt-Simon-Carves wash box, with actual operations showing behind glass.

Myers-Whaley displayed a working model of the Standard Myers-Whaley shovel.

Pennsylvania Crusher Company exhibited a working model of Bradford coal breaker and cleaner.

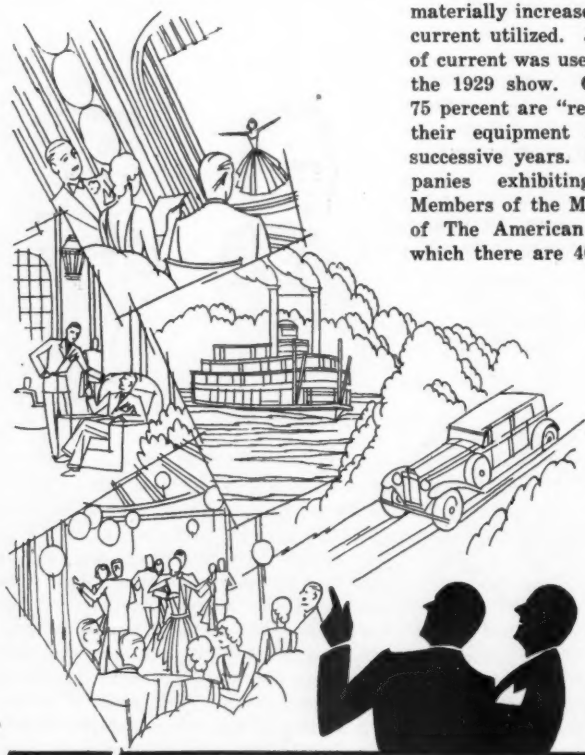
An interesting model mine was displayed by the Robinson Ventilating Company, showing the application of several types of fans for use in mine ventilation.

Sanford-Day exhibited their miniature coal mine equipped with the automatic dump cars. This exhibit is always interesting and always draws much attention from exposition crowds.

SKF Industries showed a small car equipped with bearings propelled up a slight grade by air current, which was automatically turned off, allowing the car to coast back to its starting place.

The U. S. Bureau of Mines displayed a model of a mine section showing two types of barricades.

The Watt Car and Wheel Company had a most unusual exhibit, which was developed in conjunction with the Allen Garcia Company. This was a model with a train of several cars, operating through





a miniature mine and dumping while in full motion by means of car bodies hinged to one side of their trucks.

Century Wood Preserving Company displayed some miniature timber treating plants.

Morrow Manufacturing Company had a working model, beautifully made and in full operation, showing the many conveyor screens and loading booms of a four-track tippie. This very complete model was so large that it occupied a double space.

Another interesting exhibit of models were the two loading booms shown by the Anthracite Separator Company. One of these was a spiral chute, while the other, which was a more completely operated unit, showed a miniature car being loaded by a new type of boom, raised or lowered vertically into the car, handling coal with a minimum of breakage. While coal runs free into this boom, it will choke automatically when the boom is not raised sufficiently so that there is no overloading or spillage.

Among the more amusing exhibits were the equilibrium tester at the exhibit of the Electric Railway Equipment Company, and the mechanical horse displayed at the first-aid booth of Max Woher.

Moving pictures played an important part in both the exhibits and convention. The film showing the 100 percent mechanization at the Wildwood mine was an important feature of the convention itself. At The Mining Congress Journal booth were shown movies taken at the convention, showing crowds arriving, important personages, etc.

General Electric Company had a fully equipped,

small moving-picture house, where they showed the complete processes pursued in some of their manufacturing plants, as well as many other interesting pictures, such as the launching of the modern ship, etc. These General Electric films were of the sound type and explained audibly the operating processes as they were shown.

There were a number of other commercial movies on display in various booths. These movies made clear in a few minutes many processes which otherwise required much study and explaining.

Among other interesting equipment displayed by Westinghouse was the famous televox man.

Many of the booths were arranged most attractively; one of the most inviting of these was that of the Ohio Brass Company, arranged with brick pillars, a white picket fence with pergola within.

Other unusual things were models of magnets for separating tramp iron from coal. There were also workmen actually assembling motors at the exposition and pumps constructed partly from glass showing operations.

There were, of course, a large number of full-size pieces of equipment, many of which were in actual operation. These included loading machines, pit-car loaders, locomotives, cutting machines, motors, screens, crushers, automatic control boards, mine cars, rail and switch equipment, line material, rail

## A toast to coal

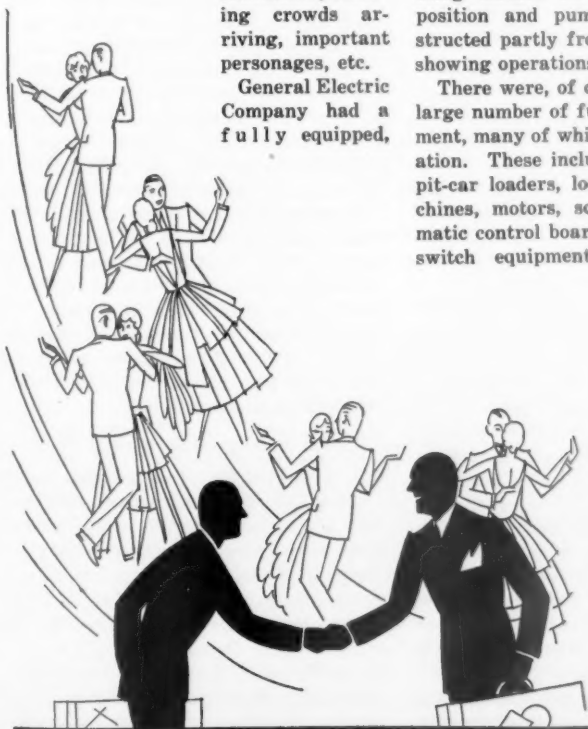
*Mr. Toastmaster, Ladies and Gentlemen:*

You have asked me to respond to the toast "Coal": the greatest boom of a generous Creator to mankind. I have seen it "under the alchemy of science transmuted into thousands of new and useful forms"—fuel for metallurgy and the fabrication of metals, "heat for the fireside, light for the darkness," energy for the gas engine, motion for the locomotive, power for the factory, fertilizer for plants, ice for refrigeration, fungicides and germicides for sterilization and fumigation, a solvent for shellac, a preservative for wood, a cleanser for cloth, an aseptic for wounds, poisons for parasites and bugs, medicine for man and beast, flavoring for food and confections, and scent for perfumes and cosmetics.

Thus, through "human touch," I have seen it become "comfort in the home or death at the battlefield, and yield a corrosive acid that burns like fire or a sweetness that makes sugar seem insipid." I have seen it "transformed into colors that make the rainbow envious of their brightness and variety; and I have seen it changed into explosives that make the thunderbolts jealous of their power."

And when the fountains of Heaven are closed and the waters in the rivers too feeble to turn the turbines, I have seen it flow from the mouth of many mines, in a sombre stream of potential energy to operate the steam-driven generators; so that the wheels of industry continued to whirl without interruption; but, ladies and gentlemen, I want to say to you now, that as a means of livelihood it's a damn failure.

JAMES L. DAVIDSON, *Secretary,  
Alabama Mining Institute,  
at the "Dixie Breakfast."*



# LEGISLATIVE Review . . . . .

**W**ITH only the flexible provision of the act hanging in the balance, the 16 months' sojourn of the tariff revision bill in the Halls of Congress draws to a close with the prospects of being approved by the legislative bodies and signed by the President.

## SILVER DUTY DEFEATED

The proposal to place a duty of 30 cents an ounce on silver was definitely eliminated from the measure after the House of Representatives defeated the amendment by a vote of 202 to 72 and the Senate members of the Joint Conference Committee subsequently agreed to leave the metal on the free list. Proponents of the silver duty are now expected to direct their efforts towards securing favorable action upon the bill (H. R. 12282) introduced in the House recently by Representative Arentz, of Nevada, which would place an embargo on silver ores and bullion, excepting such as are imported for the purpose of refining, minting, etc. This proposal is now before the House Committee on Ways and Means.

In voicing his opposition to the silver amendment, Representative Hawley, of Oregon, said:

"The majority members of the House conferees, and I understand one of the minority members," said Representative Hawley, of Oregon, "oppose the amendment as not practicable. Briefly I shall state the reasons. We import into the United States, on a five-year average, 107,000,000 ounces of silver yearly, chiefly from Mexico, coming in to be smelted and refined and part of it to be coined, but it will all be exported. We produce in this country, of new silver, some 4,000,000 ounces.

"We get from scrap and recovered silver over 9,700,000 ounces more, making a total annual production on five-year averages of about 74,000,000 ounces," Mr. Hawley said. "We export 34,000,000 ounces of our own production. Consequently we leave in this country for use in the art and sciences and for coinage approximately 40,000,000 ounces of silver. We export 141,000,000 ounces. If this duty is imposed, under the drawback system it will be brought into this country, smelted, refined, and

exported, retaining in the Treasury only 1 percent of the duty. Consequently the silver will continue to come in and be smelted and be exported. It has been argued in behalf of the duty that if this duty be imposed and enforced the smelters of this country would not be employed in smelting this imported silver, and, therefore, there would be more opportunity for smelting our own ore; but that is not a tariff problem. Under the situation, not discussing at this time the economic factors further than I have, your conferees can not find in this a justification for the imposition of a duty of 30 cents per ounce on imported silver."

In speaking in favor of the duty, Representative Colton, of Utah, stated: "Mining is one of the basic industries of this country. It has contributed and is now contributing very greatly to the material prosperity of our country. Mining as an industry is languishing, particularly silver mining. If there is anything the Government can do to help this great industry it should not hesitate to do it.

"Personally I want to be perfectly frank in saying that the levying of a duty on silver of 30 cents an ounce is perhaps more or less of an experiment. But this country is committed to the principle of a protective tariff. It must be considered as a policy, and therefore if an industry is languishing and if it has met and is meeting with keen and detrimental competition from other countries, this country is justified in adopting the policy of protection for that industry. That is the exact situation with reference to silver. We have not hesitated to place other commodities on a protective basis even though we are producing an exportable surplus.

"In addition to the general mining industry being in a languishing condition at the present time, silver especially is faced with a serious problem," Mr. Colton said. "Great Britain is forcing India to a gold-standard basis. Silver has been the accepted coin and medium of exchange in India since the dawn of civilization. But now Great Britain is forcing a situation over there which not only demonetizes silver but which forces it from that country. It is destroying

silver and dumping it upon our market. Whenever a rupee or any other silver coin finds its way into a bank in India it is melted and sent out of the country, so that the policy of dumping foreign silver upon our market has created an acute situation which this country must face. The problem is before us for solution. Something must be done.

"In 1928, 55,000,000 ounces of silver were dumped on the markets of the world in this way by the British government. Silver is being taken out of circulation in India. It has been argued that if a tariff rate is placed upon silver it will increase the price to the consumer. It is said the manufacturer will have to pay more, and consequently will pass it on to the consumer. Let us discuss the facts for a moment in connection with this statement. In 1922 we placed a duty of 60 percent ad valorem upon manufactured silver articles coming into this country. This bill imposes a duty of 65 percent ad valorem on manufactured silver articles. This means an increase of 5.

"In 1922 silver was worth about 75 cents an ounce. Now it is worth about 42 cents. If the tariff is 100 percent effective, the cost of silver to the manufacturer would be less than in 1922. During this period of decline has the price of manufactured articles had a corresponding decline? We all know it has not.

"With an increased protection for the producer there would be none of the extra cost passed on to the purchaser. Besides, you will realize that the difference between the cost of production in this country and abroad is very great.

"Where the miners of the southern republics are receiving from \$1.21 to \$1.60 per day in the mines, our men are receiving from \$4.50 to \$5 a day for the same labor. In fact, the mining industry has always paid its labor good wages. It is one of the best wage-paying industries in the country. With the difference between the cost of production here and in other countries, we can not keep up the high wage scale in the mining industry unless we receive help from some source. We therefore appeal today for an adequate tariff for this great industry," Mr. Colton concluded.

## SUSPENSION OF ASSESSMENT WORK

Senator Smoot, of Utah, has introduced a bill (S. 4337), which would suspend the requirements of annual assessment work on mining claims during the years 1929 and 1930.

An adverse report upon the bill was sent to the Senate by Secretary Wilbur of the Interior Department and Commissioner Moore of the General Land Office.

The two officials say in the report that waiving the requirement for such work

would tend to keep many claims idle and retard mining development throughout the country. They also express the opinion that not many local locaters would be benefited by such a waiver and intimate that the chief beneficiaries would be absentee claim holders.

#### BILL AIMED AT LABOR INJUNCTIONS AND CONTRACTS

Legislation designed to restrain Federal judges from issuing injunctions in labor disputes and prohibiting the making of company contracts (referred to by labor unions as "yellow dog" contracts), is provided for in a measure drawn up by a subcommittee of the Senate Judiciary Committee.

The purpose of the measure is contained in a declaration of public policy embodied in it, in part as follows: "Under prevailing economic conditions, developed with the aid of governmental authority for owners of property to organize in the corporate and other forms of ownership association, the individual unorganized worker is commonly helpless to exercise actual liberty of contract and to protect his freedom of labor, and thereby obtain acceptable terms and conditions of employment. It is necessary that he have full freedom of association, self-organization, and designation of representatives of his own choosing, to negotiate the terms and conditions of his employment, and that he shall be free from restraint or coercion of employers."

The bill provides that no contract shall be enforceable or shall afford any basis for the granting of legal or equitable relief by any court of the United States when by its terms either party to such contract agree not to join or remain a member of any labor organization, or to withdraw from the employment in the event he does join such organization.

The bill further provides that no court of the United States shall have jurisdiction to issue a restraining order or an injunction in cases growing out of any labor dispute to prohibit any of the following acts:

1. Ceasing or refusing to perform any work or to remain in any relation of employment.
2. Becoming or remaining a member of any labor organization or any employer organization.
3. Paying or giving to, or withholding from, any person participating in such labor dispute any benefits, insurance, or other money or things of value.
4. By lawful means aiding any person participating and interested in any labor dispute who is being proceeded against or prosecuted in any court of the United States.
5. Giving publicity to the existence of or the facts involved in any labor dispute.

6. Assembling peaceably to act in promotion of their interests in a labor dispute.

7. Advising or notifying any person to do any of the acts heretofore specified.

8. Agreeing with any other person to do or not to do any of the acts heretofore specified, and

9. Advising, urging or inducing without fraud the acts heretofore specified.

#### SENATE PASSES EMPLOYMENT BILLS

The Senate passed three employment bills of Senator Wagner, New York. The first (S. 3059), provides for the establishment of a Federal employment stabilization board to be composed of the Secretaries of the Treasury, Commerce, Agriculture and Labor, who shall keep the President advised as to trends of employment and business. During times of business depression or unemployment the President would submit estimates to Congress of appropriations to be expended upon public works in order to relieve unemployment.

The second (S. 3061), would require the Department of Labor to publish monthly statistics on the volume and change in employment, covering not only the number of workers, but hours worked for the Federal Government and for the following industries: Manufacturing, mining, quarrying and crude petroleum production, building construction, agriculture and lumbering, transportation, communication and other utilities, and retail and wholesale trades.

The third bill (S. 3060), would create a Federal stabilization of employment bureau and authorize a \$4,000,000 Federal fund in providing employment bureaus throughout the country. Seventy-five percent of this appropriation is to be divided among the several states in proportion to population, provided each of such states shall appropriate an equal amount.

Congress is clearing up the bills making appropriations for the Government departments for the year beginning July 1. In passing the Treasury Department bill, the Senate authorized the continuance of assay offices at Carson City, Nev.; Boise, Idaho; Helena, Mont, and Salt Lake City, Utah. The House had voted to discontinue these offices after July 1.

By approving the deficiency appropriation bill, the President has made available the following funds: \$50,000 for plugging by the Geological Survey of abandoned oil wells drilled on land whose mineral rights are held by the Government; \$180,000 for helium production and conservation by the Bureau of Mines; \$10,000 for supervision by the Geological Survey of mining operations on Indian lands; \$240,000 for investigations by the Federal Trade Commission.

The Senate ratified a treaty granting Americans the right to acquire concessions to mineral lands in the Belgian Congo.

Responding to a Senate resolution the Treasury Department furnished statistics as to imports of oil and gasoline during the last three years.

The following is a summary of recent action on bills by Congress:

H. R. 6153. Mr. Colton (Rep., Utah). Appropriates \$50,000 for investigation by a Presidential commission of the conservation and administration of the public domain. Enacted into law.

S. Res. 252. Mr. Nye (Rep., N. Dak.). To continue until March 4, 1931, the investigation by the Senate Public Lands Committee as to establishing additional national forests. Public Lands.

S. 3774. Mr. Norbeck (Rep., S. Dak.). Restricts mining titles in national forests in South Dakota to the surface of the land. Passed by Senate.

S. 4055. Mr. Nye (Rep., N. Dak.). Amends the mining laws of Alaska and repeals the act of August 1, 1912, relating to placer claims in Alaska. It provides as follows: That during each year commencing July 1, succeeding the date of location and until patent has been issued, at least \$100 worth of labor shall be performed or improvements made on, or for the benefit or development of, each mining claim in Alaska, heretofore or hereafter located; and upon a failure to comply with these conditions the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location of the same had ever been made: Provided, That the original locators, their heirs, assigns, or legal representatives, have not resumed work upon the claim after failure and before such location: Provided further, That except as herein modified the Act of Congress approved March 2, 1907, shall remain in full force and effect.

That the Act entitled "An Act to modify and amend the mining laws in their applications to Alaska, and for other purposes," approved August 1, 1912, as amended by the Act of March 3, 1925 are repealed. Public Lands.

H. R. 3820. This bill amends the stock raising homestead act, one of its provisions reading as follows:

That for the purposes of this act lands withdrawn or reserved solely as valuable for oil or gas, other than naval petroleum reserves, shall not be deemed to be appropriated or reserved unless such lands shall be within the limits of the geologic structure of a producing oil or gas field, and any patent therefor shall contain a reservation to the United States of all minerals in said lands, and the right to prospect for, mine, and remove the same. Passed by House.

S. 4140. Mr. (Continued on page 523)



TABLE NO. 1  
Mechanized Mines and Equipment Units in Operation

CENTRAL FIELD Illinois—Indiana—Western Kentucky								
Types of equipment	Number of mechanized mines	Number of equipment units	Number of mines classified by percentages of mechanized loading			Number of mines in various seam heights		
			90%	—90%	—10%	+6 ft.	+4 to 6 ft	—4 ft.
Mechanical Loaders	15	106	11	3	1	12	3	..
Pit Car Loaders	43	1,341	25	14	4	29	14	..
Mechanical Loaders and Pit Car Loaders	15	132	11	3	1	14	1	..
Mechanical Loaders, Pit Car Loaders, and Scrapers	1	1	..	..	1	..	1	..
TOTAL	74	2,004	47	20	7	55	19	..
NORTHERN APPALACHIAN Pennsylvania—Maryland—Ohio—Northern West Virginia								
Mechanical Loaders	6	29	4	2	..	5	1	..
Pit Car Loaders	7	41	..	3	4	4	3	..
Conveyors	26	69	..	15	11	..	2	24
Scrapers	11	54	3	6	2	..	1	10
Conveyors and Scrapers	3	6	..	3	..	..	..	8
Mechanical Loaders and Pit Car Loaders	2	10	..	2	..	2	..	..
TOTAL	55	237	7	31	17	11	7	37
SOUTHERN APPALACHIAN Southern West Virginia—Virginia—Eastern Kentucky—Tennessee								
Mechanical Loaders	13	21	..	12	1	13	..	..
Pit Car Loaders	1	6	..	..	1	..	1	..
Conveyors	6	15	2	2	2	..	1	5
Scrapers	2	5	..	1	1	..	..	2
TOTAL	22	47	2	15	5	13	2	7
SOUTHERN Alabama—Arkansas—Oklahoma								
Pit Car Loaders	3	33	..	1	2	3	..	..
Scrapers	1	4	..	1	..	..	..	1
Conveyors	15	43	8	6	1	1	2	12
Scows	4	9	3	1	..	..	..	4
Conveyors and Scows	3	6	3	..	..	..	..	3
Conveyors and Pit Car Loaders	5	20	5	..	..	1	..	4
Pit Cars	1	22	1	..	..	..	1	..
Scrapers and Conveyors	1	3	..	..	..	..	..	..
TOTAL	32	185	20	9	3	5	3	24
ROCKY MOUNTAIN Montana—Wyoming—Utah—Colorado—New Mexico								
Mechanical Loaders	11	53	4	7	..	11	..	..
Pit Cars	4	33	1	3	..	2	2	..
Conveyors	10	18	1	6	3	4	3	8
Scrapers	3	6	..	2	1	2	..	1
Mechanical Loaders and Pit Car Loaders	1	3	..	1	..	..	1	..
Mechanical Loaders and Conveyors	3	7	..	3	..	2	1	..
Mechanical Loaders and Scrapers	2	13	..	2	..	2	..	..
Conveyors and Pit Car Loaders	9	5	3	5	1	4	5	..
Scrapers and Conveyors	1	4	..	1	..	1	..	..
Scrapers and Pit Car Loaders	1	1	..	1	..	..	1	..
Pit Car Loaders	1	2	1	..	..	1	..	..
Conveyors and Scrapers	1	10	1	..	..	1	..	..
Mechanical Loaders	1	14	1	..	..	1	..	..
Conveyors and Scrapers	1	5	..	..	..	..	..	..
TOTAL	47	245	11	31	5	30	13	4
TOTAL FOR UNITED STATES								
	230	2,718	87	106	37	114	44	72



# MECHANIZED MINING

By G. B. Southward \*

**T**HE purpose of this report is to show the lines along which mechanized loading is being developed, and the data which is here submitted covers 230 mechanized mines located in the principal coal fields of the United States. This does not include every mine in this country that is using mechanized loading but it is believed that there are a sufficient number of operations in this list to present a fairly comprehensive description of coal mine mechanization as it exists today. The figures given here deal only with the number of mines and the number of mechanized loading units in operation and do not include tonnage figures. The tonnages now being produced with the different types of equipment show the extent to which the mechanized production has increased over preceding years and that growth or increase shows what may be expected in the future. It is of equal interest and importance to determine, if possible, the trend which mechanization is following and this can best be done by a study of the uses of the different types of equipment, and the extent to which each type is being operated in the different fields and under different seam conditions.

In attempting to determine this trend there must be a number of factors taken into account such as the type of equipment or combinations of two or more types, the thickness of the seams mined, and the percentage or extent to which the loading is mechanized under these conditions. Geographical location also has had some influence on the developments and in *Table No. 1* the mines are divided into the following five fields:

(1) **THE CENTRAL FIELD**—Including Indiana, Illinois, and Western Kentucky.

(2) **THE NORTHERN APPALACHIAN FIELD**—Including Ohio, Pennsylvania, Maryland, and Northern West Virginia.

(3) **THE SOUTHERN APPALACHIAN FIELD**—Including Southern West Virginia, Virginia, Eastern Kentucky, and Tennessee.

(4) **THE SOUTHERN FIELD**—Including Alabama, Arkansas, and Oklahoma.

(5) **THE ROCKY MOUNTAIN FIELD**—Including Montana, Wyoming, Utah, Colorado, and New Mexico.

The tonnage increases which were made during the last year are a direct evidence of the success of mechanized loading as it is hard to believe that there would be so great a production mined from purely experimental operations. There may be some question, however, as to what percentage of the mines that are now using loading equipment are experimental and what percentage have proven the equipment to be more economical than hand loading. It would be difficult to answer this question with absolute accuracy but from the figures which we have there can be a very close approximation given. This would be based on

the extent or percentage to which each of these mines have adopted mechanized loading and have discarded hand work. It is a safe assumption that a mine which is 100 percent mechanized has proven its economy to the satisfaction of the management and it is equally true that a mine which has mechanized as much as 90 percent of its loading can be considered as successfully proven and definitely committed to complete mechanization. It is probable that most mines which are more than 50 percent mechanized are successful but in order to eliminate any doubt or question, the higher figure of 90 percent has been used in this report.

The determination of the number of mines which are on an experimental basis is a matter of some doubt but this report has assumed that the operations are experimental in which the total output of the mines is less than 10 percent mechanized. This is not quite true as there are individual cases where one unit has been installed and found successful but the additional equipment has not been put in operation although it is the intention of the management to do so. To balance against this there are mines which are more than 10 percent mechanized that are still experimental and it is very probable that the number of these will approximately off-set any errors made in the first assumption.

The mines which are more than 10 percent and less than 90 percent mechanized, include some which are successful, some in which the success is not yet proven and a comparatively few that are unsuccessful and where some change is likely to be made. There is no attempt in this article to divide the mines in this class since their analysis would be entirely a matter of opinion and could not be supported by any figures which we have on hand.

The geographic location of the mine appears to have had quite a little effect in the adoption of mechanized loading. A summary of the operations shows the following divisions:

**CENTRAL FIELD**—74 mines with 47 mines 90 percent mechanized.

**NORTHERN APPALACHIAN FIELD**—55 mines with 7 mines 90 percent mechanized.

**SOUTHERN APPALACHIAN FIELD**—22 mines with 2 mines 90 percent mechanized.

**SOUTHERN FIELD**—32 mines with 20 mines 90 percent mechanized.

**ROCKY MOUNTAIN FIELD**—47 mines with 11 mines 90 percent mechanized.

Keeping in mind that these figures do not show the number of hand loading mines in each of these fields this table will indicate the degree of success with mechanization that is being had in the different sections of the country. The reasons for the unequal rate of development being made in the different fields is in some cases due to the physical conditions of the seams, in some cases due

to the labor situation and in others it is due to the market requirements. It is probably true that the difficulties in any one field are about the same as in the others although the difficulties may be of a different class and in the final analysis it is the need for economies over hand loading that determines the effort made by the operators to adopt mechanization as a means for lowering their mining costs. A comparison of the development in the different fields with the various types of equipment is made in *Table 2*.

A very interesting trend is the number of mines using two or more different types of machines. This is given in *Table 3* showing that 181 of the 230 mines use only one type of machine but 45 mines have 7 different combinations of two types of equipment, and 4 mines have combinations of three types. The success of these is indicated by the fact that over 50 percent of the mines using combinations are more than 90 percent mechanized. This is a higher percentage than in the single type operations where 62 out of the 181 or approximately one-third are 90 percent mechanized. In other words the use of two or more kinds of loading equipment does not seem to be at all experimental and following are a number of examples of where it has been found advisable to use two different types of equipment in the same mine.

(a) In pillar recovery where it is not considered advisable to subject expensive equipment to the roof hazards and a less expensive type of machine is used in the pillar work.

(b) In some mines there will be panels so nearly worked out that territory suitable for a large unit production is not possible and in such cases smaller type machines are installed to reduce the overhead cost.

(c) In mines where the seam height is subject to considerable variation it is found advisable to install different types of machines to suit the varying heights of the coal.

(d) Where it is necessary to develop one or two isolated entries a cheaper type of machine may be more suitable than a larger type used in the production areas.

(e) A mine using a long face method may require different types of equipment for the face work and for the entry development.

(f) Certain mines have men who are not adaptable to machine operation but can be used as hand shovelers with conveyors or pit car loaders.

In order to show the extent of the development under different seam heights with the different types of equipment there are four tables submitted with this article assembling the information from *Table 1* and breaking it up in several ways. Each of these tables shows the relations between several factors and it is necessary to study all four for a correct understanding of coal mine mechanization now in operation.

\* Mechanization Engineer, The American Mining Congress.

Table 3 shows the number of mines operating mechanized loading and the number of equipment units installed. The horizontal lines classify the mines according to the various types of equipment and show the number of units operating both where one type and where two or more types are in use. The vertical columns show the total number of machine units but in order to gauge correctly the relative importance of each type of equipment the tonnage which they produce should be taken into account. The tonnage figures are not available and in their absence an estimate can be made based on average productive capacities. This would list the types of equipment in the following order and ratio:

Mechanical loaders .....	45
Pit car loaders.....	40
Conveyors .....	10
Scrapers .....	5

Table 4 classifies in the horizontal lines the total number of 230 mines according to the one or several types of equipment used as was done in Table 3. The vertical columns separate the mines in two ways—by the thickness of the seams and by the percentage or extent to which the total output of the mines use mechanized loading. Thick seams are those greater than 6 ft. in height, medium seams are from 4½ to less than 6 ft., and thin seams are those less than 4 ft. This table shows that more than one-half of

these operations are in seams having less than 6 ft. of coal and more than one-third of the mechanized mines are producing approximately their entire output with mechanized loading while only one-sixth of the total are producing less than 10 percent. It also shows that more than one-half of the mines using two or more types of loading equipment are completely mechanized while only one-twelfth of these are experimental or loading less than 10 percent.

Table 5 makes the same classifications in the horizontal divisions as in Tables 3 and 4. The vertical columns separate the mines into three divisions of high, medium, and low coal and further separates each of these two divisions into

TABLE NO. 2  
Number of Mechanized Loading Mines and Types of Equipment in the United States

Total in U. S.	Central Field	Northern Appalachian	Southern Appalachian	Southern	Rocky Mountains
45 Mechanical loaders .....	15	6	13	...	11
58 Pit car loaders .....	43	7	1	3	4
57 Conveyors (including duckbills) .....	...	26	6	15	10
17 Scrapers .....	...	11	2	1	3
4 Scows (Arkansas) .....	...	...	...	4	...
18 Mechanical loaders and pit car loaders.....	15	2	...	...	1
3 Mechanical loaders and conveyors.....	...	...	...	...	3
2 Mechanical loaders and scrapers.....	...	...	...	...	2
14 Pit car loaders and conveyors.....	...	...	...	5	9
1 Pit car loaders and scrapers.....	...	3	...	...	1
4 Conveyors and scrapers.....	...	...	...	3	...
3 Conveyors and scows .....	...	...	...	...	...
1 Mechanical loaders, pit car loaders and scrapers.....	1	...	...	...	...
1 Mechanical loaders, conveyors and scrapers.....	...	...	...	1	1
2 Pit car loaders, conveyors and scrapers.....	...	...	...	1	1
230	74	55	22	32	47

TABLE NO. 3  
Number of Mechanized Loading Units in Mines Operating One or More Types of Equipment

No. of Mines	Types of Mechanized Loading	NUMBER OF EQUIPMENT UNITS IN OPERATION				
		Mechanical Loaders	Pit Car Loaders	Conveyors	Scrapers	Scows
45 Mechanical loaders .....	...	209	...	...	...	...
58 Pit car loaders.....	...	...	1,454	...	...	...
57 Conveyors (including duckbills).....	...	...	...	145	...	...
17 Scrapers .....	...	...	...	...	69	...
4 Scows (Arkansas) .....	...	...	...	...	...	9
18 Mechanical loaders and pit car loaders.....	...	145	450	...	...	...
3 Mechanical loaders and conveyors.....	...	6	...	18	...	...
2 Mechanical loaders and scrapers.....	...	5	...	...	4	...
14 Pit car loaders and conveyors.....	...	...	54	59	...	...
1 Pit car loaders and scrapers.....	...	...	2	...	2	...
4 Conveyors and scrapers .....	...	...	...	7	7	...
3 Conveyors and scows .....	...	...	...	...	...	3
1 Mechanical loaders, pit car loaders, and scrapers.....	...	1	1	6	2	...
1 Mechanical loaders, conveyors, scrapers.....	...	1	...	...	1	...
2 Pit car loaders, conveyors and scrapers.....	...	...	32	17	8	...
230 Total .....	...	367	1,993	253*	93	12

\* This number shows operating units and each operating unit usually includes one face and one haulage conveyor.

TABLE NO. 4  
Percentage of Mechanized Loading and Thickness of Seams Mined

No. of Mines	Types of Equipment	Number of Mines and Percentage of Mechanized Loading			Number of Mines in Various Seam Heights*		
		+90%	-90% to +10%	-10%	Thick Seams	Medium Seams	Thin Seams
45 Mechanical loaders .....	...	19	24	2	41	4	..
58 Pit car loaders .....	...	26	21	11	38	20	..
57 Conveyors (including duckbills).....	...	11	29	17	5	8	44
17 Scrapers .....	...	3	11	3	2	1	14
4 Scows .....	...	3	1	..	..	..	4
18 Mechanical loaders and pit car loaders.....	...	11	6	1	16	2	..
3 Mechanical loaders and conveyors.....	...	..	3	..	2	1	..
2 Mechanical loaders and scrapers .....	...	..	2	..	2	..	..
14 Pit car loaders and conveyors .....	...	8	5	1	5	5	4
1 Pit car loaders and scrapers .....	...	..	1	..	..	1	..
4 Conveyors and scrapers .....	...	..	3	1	1	..	3
3 Conveyors and scows .....	...	3	..	..	..	..	..
1 Mechanical loaders, pit car loaders, scrapers.....	...	..	..	1	..	1	..
1 Mechanical loaders, conveyors and scrapers.....	...	1	..	..	1	..	..
2 Pit car loaders, conveyors and scrapers.....	...	2	..	..	1	1	..
230 Total .....	...	87	106	37	114	44	72

\* Thick seams are greater than 6 ft.; medium seams are from 4 to 6 ft., and thin seams are less than 4 ft.

the number of mines that have mechanized their loading more than 90 percent, less than 90 and more than 10 percent, and less than 10 percent. The horizontal lines by showing the number of mines that are completely or partially mechanized in each seam and percentage classification will indicate the adaptability of each type of equipment or combination of types to different seam heights. The vertical columns indicate the extent to which the different thicknesses of coal are mechanized with all classes of equipment. By comparing the figures for the totals of the vertical columns it will be seen that the seam thickness has had a

marked influence on the development as 45 percent of the mechanized mines in high coal produce more than 90 percent of their output with mechanized loading. This percentage decreases with the thickness of the coal to 36 percent in the medium seams and 20 percent in thin seams.

The operations covered in this report are confined entirely to the bituminous fields as complete data on anthracite mining has not yet been compiled. The major trend in anthracite mechanization has been in low coal and seams less than 2 ft. in thickness are being successfully operated with mechanized loading. The earlier operations were with scrapers,

but within the last few years there have been a number of installations with conveyors of all three types—shaking, chain, and belt. Conveyors and scrapers are used both in room and pillar work and in long face mining. Mechanical loaders are also used to some extent, but for the most part these are confined to rock work. The successful mechanized loading in thin veins has had the effect of increasing the reserve areas of minable anthracite and seams which were formerly considered too low for profitable hand operation are now being mined in successful competition with hand loading in the thicker seams.

TABLE NO. 5  
Percentage of Mechanized Loading in Seams of Different Heights

No. of Mines	Types of Equipment	Number of Mines and Percentage of Mechanized Loading in Thick Seams			Number of Mines and Percentage of Mechanized Loading in Medium Seams			Number of Mines and Percentage of Mechanized Loading in Thin Seams		
		+90% (-90% to +10%)	-10%		+90% (-90% to +10%)	-10%		+90% (-90% to +10%)	-10%	
45	Mechanical loaders .....	17	23	1	2	1	1	..	..	..
58	Pit car loaders .....	16	15	7	10	6	4	..	..	..
57	Conveyors (including duckbills) .....	2	2	1	1	5	2	3	22	14
17	Scrapers .....	..	2	..	..	..	1	3	9	2
4	Scows (Arkansas) .....	..	..	..	..	..	..	3	1	..
18	Mechanical loaders and pit car loaders .....	11	5	..	..	1	1	..	..	..
3	Mechanical loaders and conveyors .....	..	2	..	..	1	..	..	..	..
2	Mechanical loaders and scrapers .....	..	2	..	..	..	..	..	..	..
14	Pit car loaders and conveyors .....	3	2	..	2	2	1	3	1	..
1	Pit car loaders and scrapers .....	..	..	..	..	1	..	..	..	..
4	Conveyors and scrapers .....	..	1	..	..	..	..	..	2	1
3	Conveyors and scows .....	..	..	..	..	..	..	3	..	..
1	Mechanical loaders, pit car loaders and scrapers .....	..	..	..	..	..	1	..	..	..
1	Mechanical loaders, conveyors and scrapers .....	..	..	..	..	..	..	..	..	..
2	Pit car loaders, conveyors and scrapers .....	1	..	..	1	..	..	..	..	..
230	Total .....	51	54	9	16	17	11	20	35	17

#### LEGISLATIVE REVIEW

(from page 519)

Frazier (Rep., N. Dak.). Provides for the sale of coal and asphalt deposits on lands of the Choctaw and Chickasaw Indians in Oklahoma. Reported by Senate Indian Committee.

H. R. 9939. To lease Choctaw and Chickasaw Indian lands for oil and gas. Reported by Indian Affairs.

H. R. 11239. To extend Section 2455 to Government coal lands in Alabama. Reported by Public Lands Committee.

H. R. 6998. To establish an assay office at Dahlonega, Ga. Reported by Coinage Committee.

H. R. 8154. Authorizing lease of oil and gas deposits in or under railroad and other rights of way. Reported by Senate Public Lands.

S. J. Res. 165. To settle for \$2,906,484 the suit of the Government against the Sinclair Crude Oil Purchasing Co. Passed by Senate.

H. J. Res. 244. To invite participation by states and foreign countries in International Petroleum Exposition at Tulsa, October 4 to 11. Passed by House.

H. R. 11877. Mr. McSwain (Dem., S. C.). To lease the Muscle Shoals, Ala., power and nitrate projects. Military Affairs.

#### A. S. & R. IMPROVES PENSION PLAN

Simon Guggenheim, president of the American Smelting and Refining Company, has announced a revision in the company's pension plan whereby pension appropriations, already exceeding \$5,500,000, will be administered under a trust for the benefit of approximately 11,000 employees, who also receive the right under the new arrangement, of making a substantial increase in their pensions by means of personal contributions. The employees' contributions, together with certain appropriations of the company, will be used to buy deferred annuities from a life insurance company.

Revision of the company's original pension plan, established in 1912, was approved by the stockholders at a recent meeting.

The \$5,500,000 pension fund, together with future accretions—established for the benefit of all eligible employees whether contributors or not—is segregated under deed of trust and administered by the pension board of the company. The plan has been worked out by the pension board under the leadership of the chairman, William Loeb, vice president.

All employees, including officers, of American Smelting, its subsidiaries and controlled companies within the United

States, are affected by the pension plan. The pension fund now established, and to be augmented by further contributions of the company, has been set up to provide, without cost to employees, pensions ranging from a minimum of \$300 a year to a maximum of \$3,000 a year.

#### NEW EXPLORATIONS IN ALASKA

The Department of the Interior announces plans for the surveys that will be conducted in Alaska during the coming season by field parties of the Geological Survey, in continuance of the investigation of Alaska's mineral resources. The projects include exploratory and reconnaissance geologic and topographic surveys in several parts of the Territory and more detailed examinations of certain tracts and mineral commodities.

The chief Alaskan geologist will carry on general studies of recent mineral developments in certain of the mining districts throughout the Territory, with the aim of gathering facts essential to preparing the annual statistical canvass and maintaining a general administrative oversight of the Geological Survey's work in Alaska. Detailed plans for this work can not be stated at this time, as they will necessarily be dependent upon field conditions and the time available for such studies.



## PRACTICAL OPERATING MEN'S DEPARTMENT



# COAL

NEWELL G. ALFORD  
Editor

Practical Operating Problems  
of the Coal Mining Industry



### LONGWALL MINING *at the mines of* *the Pruden Coal & Coke Company*

*By Charles A. Griffith \**

**REALIZING** rather distressed conditions of the coal business in so far as profits are concerned, and that from year to year competitive conditions are becoming more severe, we decided to investigate a more modern method of mining as compared to the room and pillar system.

Due to the fact that our coal has a parting, we found mechanical loaders impractical without the use of a coal-cleaning plant on the outside. We therefore decided that we might pos-

\* Vice President and General Manager, Pruden Coal & Coke Company, Pruden, Tenn.

sibly be able to use the longwall system, provided we loaded our coal by hand into conveyors. About a year ago, our superintendents and I visited the Moffett and Montevallo plants in the vicinity of Birmingham, Ala., where they were using the longwall system of mining on a slope of about 15 to 20 degrees. These companies very courteously took us through their mines and explained in detail just



Charles A. Griffith

how they were progressing with the longwall system of mining. Upon our return to our mines at Pruden, Tenn., we decided to try out the system of longwall mining, but, on account of our mine being practically level, it was necessary for us to use a type of conveyor other than the one used at the Alabama operations. We purchased from the Conveyor Sales Company of New York City one con-

veyor drive and 400 ft. of troughing together with one duckbill.

In testing out this conveyor we thought it best to use it first in entry work so as to familiarize ourselves with the working of the conveyor. We had 525 ft. of entry to drive through a fault to connect up our main haul with the main part of the mine. We made very good progress with this work, taking two cuts each eight-hour shift with three men on the duckbill and two men on the motor crew. We completed the 525 ft. of entry in about 40 working days. The bottom bench of the coal in this entry was 36 in. The top or parting was taken to the top bench of coal, which varied in thickness from 40 in. to 96 in.

A jack hammer was used for drilling both coal and top. When this work was completed, we had prepared a 150-ft. wall as shown on *Figure 1*, Wall No. 1. We had not fully decided what method we would adopt to control the roof, but realized that we would have to resort to some mechanical means in the way



*Discharge end of conveyor and conveyor drive*



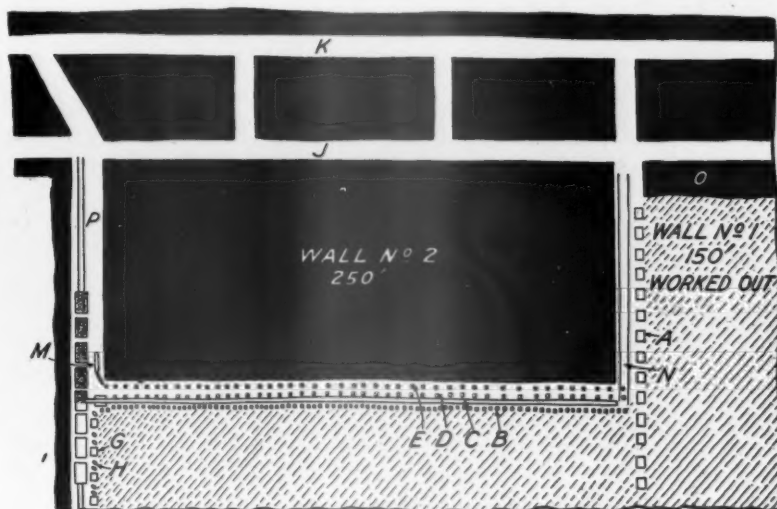


FIGURE 1

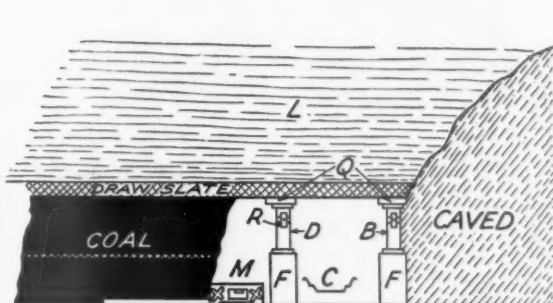


FIGURE 2

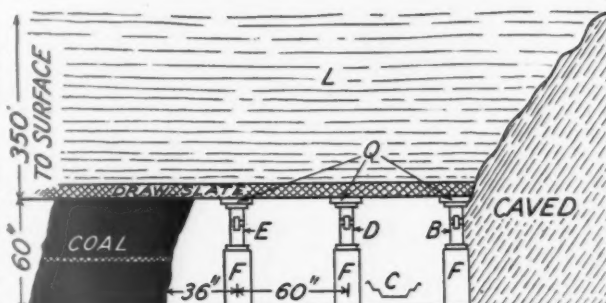


FIGURE 3

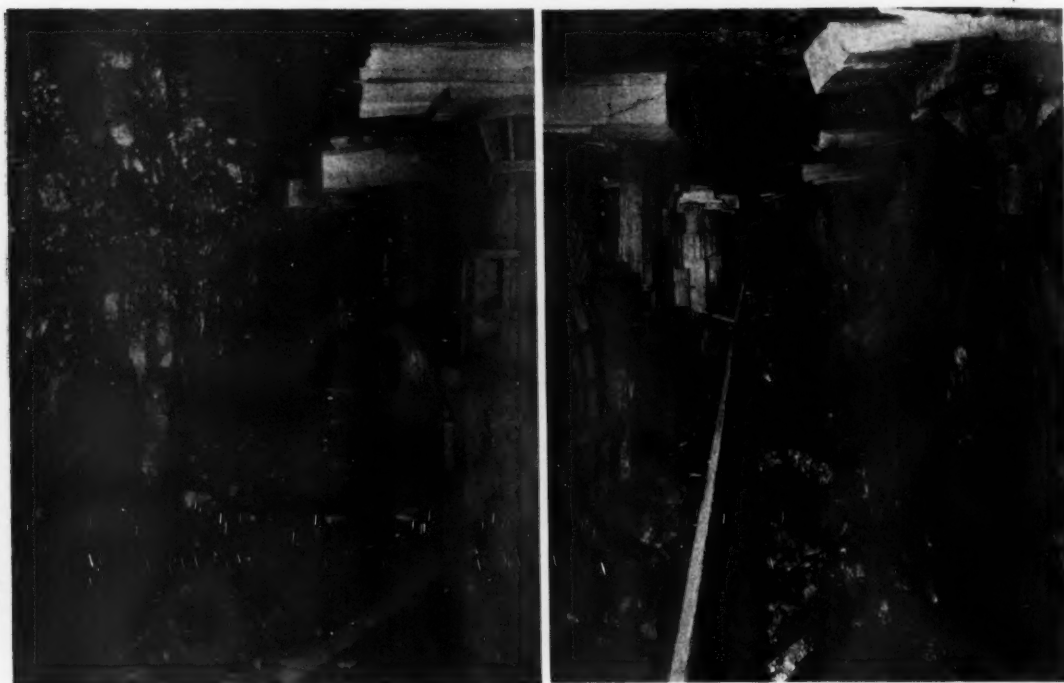
of jacks. However, we decided to start the wall and use cribs until we got our initial fall. This occurred when we had advanced the wall 65 ft. We were carrying two rows of cribs, 5 ft. on centers and 13 ft. between cribs in rows, using 8 x 8 timber 36 in. long, building cribs square. When the initial fall occurred on account of the centers of cribs in rows being too great, the top rode in between the cribs, which caused us to lose about 60 ft. of wall. (We had anticipated this fall and had moved the conveyor pans.) From the remaining 90 ft. of face, we took out three cuts next to roadway "N" with longwall machine. The other 60 ft. of wall was pushed up by using a short-wall machine, placing cribs the proper distance from face to start wall again. After we had reestablished the face, we placed our cribs 6 ft. on centers, using one row only. We learned from this that we could break our roof, but we found it entirely too expensive to remove the cribs, so we decided to shut the work down until we could order mechanical jacks. Not knowing the best type of jacks to use, we purchased some of the Arkansas sand jacks from the Engineering Works, Van Buren, Ark., which are

in sections and can be made any height. We also purchased some of the Langham jacks from the Lorain Steel Company. As soon as the jacks arrived, we commenced to operate our wall again. We placed two rows of jacks as shown by Figure 2, removing our cribs. This was done by shooting, usually two timbers in each crib. After we commenced with jacks, everything moved along very nicely. This wall was finished up to within 15 ft. of air course "J," leaving a pillar 15 ft. thick, "O." The breaker row of jacks "B" are set 30 in. on centers. Row of jacks "E" are set as soon as the cut is loaded out sufficiently for these jacks to be placed, which means 36 in. from back of cut. Mine cars are loaded on roadway "P" by elevating end of conveyor sufficiently to permit cars to pass under end of same. Longwall machine "M" is left at corner of wall in roadway "P" when cut is finished.

Figure 2 shows position of jacks B and D, also mining machine "M" cutting face. You will notice that roof "L" breaks off at breaker row "B," as shown in the caved section. This occurs after each cut as jacks are moved over.

Figure 3 shows a section of face after cut has been cleaned up and conveyor "C" ready to be moved over into new position between rows E and D. When this is done, row B is moved and the usual roof cave occurs. When we are able to hold draw slate up, we find that seven men can load out 250 ft. of wall in an eight-hour shift. On account of it being rather hard to get good men for this type of work, so far we have only used one crew, loading out coal in one shift and moving jacks and conveyor in the other shift. When we have not any trouble with draw slate, we find that the moving shift can do their work in less time than the loading out of the coal, but, of course, if we have trouble with draw slate, of which we have had quite a bit, we find that both loading and moving over takes considerable more time.

We have experimented with all sizes and thicknesses of capboard "Q," but find about the best capboard is some hard wood, such as beech, sawed 12 in. wide by 14 in. long, thickness varying from ½ in. to 6 in. By having the various thicknesses, we are able to get the



Photographs of  
jacks and con-  
veyor in posi-  
tions described  
in Figs. 2 and 3

proper thickness of cap, so that the Langham jacks are tightened by drawing in wedge "R." The length of our Langham jack is 26 in. with 10 x 10 head and base set on wood block "F," which can either be round or square, sawed from beech, gum, hickory, or any other hard wood. We find that timber "F" will not be damaged any whatever when jacks compress capboard "Q," possibly one-third the original thickness. Timber "F" is sawed 30 in. long with staple driven near top of same, so that when jack is discharged hooks can be inserted to pull timbers from the gob. We are doing this work entirely by day work, and we find that the average miner, after he has worked on the longwall for something like a week, makes a very

satisfactory man. Of course, for the first few days he is dubious of the top falling and on account of the capboard popping, etc., however after a few weeks' work, the miners pay no attention whatever to the roof caves, because they have learned to have confidence in the jacks. Occasionally we have a jack in the breaker row to be discharged, due to a large piece of roof sliding down and striking same, but on no occasion have we had more than two jacks discharged at one point. The discharge of one jack has very little effect on the roof at that point. When the face is cut, the coal sets down from one end of the face to the other. Up to the present, we have not had to fire a single shot either in Wall No. 1 or No. 2.

As I stated in the beginning, our experience with the longwall system of mining is somewhat limited, due to the fact that we have been trying out this system for about nine months. We believe after our experience at our own mines, and judging from our inspection of other operations, that the question of control of roof, after all, is more or less experimental and varies with each operation. We are fully convinced, however, that there are many advantages to be had from longwall mining, such as the loading of larger sizes of coal, the concentration of work, better supervision resulting in cleaner coal and fewer accidents, the reduction of cost of haulage due to fewer mine cars, less track and trolley wire required.



# Research in Underground Mining

By Dr. L. E. Young \*

GENERALLY we think of research as directed toward (1) the discovery of a law of nature, (2) the improvement of a machine or process, (3) the elimination of waste of materials and labor, (4) the improvement of working conditions and the safeguarding of human life, (5) the application of power, (6) the adaptation of materials to new uses, and (7) improved industrial organization resulting in larger output per man employed and per dollar invested.

A great deal of research is being carried on in coal mining but a large part of the work now in progress is in the fields of coal preparation, fuels, and safety and relatively little in underground work except as concerned with safety.

At the present time we are spending more than \$250,000,000 per year in the United States on research but only a comparatively small amount is available for research in coal mining proper. Recently a British economist made the suggestion that the rate of progress in a business or industry may be measured by two items in the cost sheet, namely, depreciation and research. If depreciation (including obsolescence) appears on the cost sheet at the rate of 5 percent per annum, the rate at which the plant and the equipment are being modernized is evident. If there is no annual budget for research, there is apparently little effort being made to improve methods and plant. The two items have a very close relationship.

Various agencies are carrying on splendid work to reduce the hazard to human life; this should be continued and expanded. But greater efforts should be made, through research particularly, to increase the efficiency of labor in mines and to use invested capital more effectively.

Various research agencies are organized and functioning—notably the United States Bureau of Mines and other departments of the Federal Government, state departments of mines and experiment stations, research departments of institutions of higher learning, professional and scientific societies, operating companies acting independently and collectively (through national and state or-

ganizations, as the American Mining Congress and the National Coal Association), consulting engineers, and research corporations, and manufacturers of equipment and supplies.

Research work and investigations may be classified as (1) field surveys, (2) field studies, and (3) field or laboratory experiments. By the term "field survey" is meant the collecting, compiling, etc., of data on methods, practices, and equipment; the end result is a report telling what has been done and what is being done. By the term "field study" is meant the observing in actual practice of methods, machines, etc., used in the accustomed manner, to determine data on which conclusions and generalizations may be based. The term "field or laboratory experiment" is used to designate that type of research in which new methods, devices, or machines are used.

Many of the research bulletins published may be classed in group one; they serve a valuable purpose as it is necessary obviously to find the facts, to know what is being done and what methods are being used successfully—as well as what methods have been tried unsuccessfully—before "creative research" is undertaken. So-called "field studies" are also essential in the determination of facts and must precede intelligent "creative research"; in many instances they will result in improved practice with present-day equipment.

The work of the various agencies engaged in research may be measured in part by the publications recording the results of investigations. Omitting the work that has been done in the fields of preparation and use of coal, the publications of research data may be grouped under the headings (1) Safety and Health and (2) Operating Methods and Engineering Problems.

In the former group there have been numerous contributions on mine gases, ventilation, coal dust, rock dusting, explosives and blasting, electricity and electric machinery, falls of roof, and mine water (pollution of streams). In the latter group may be mentioned such subjects as electric locomotives, friction of mine cars, fans and the mechanics of mine ventilation, surface subsidence and ground movement, corrosion by mine waters, treatment of mine timber, explosion-proof bulkheads, fatigue of wire-rope, face preparation, mechanical loading, and mine rescue apparatus.

The organization chart of the United States Bureau of Mines indicates the fields in which research is being carried on by the bureau, other than in safety and safety engineering in which fields numerous bulletins have been published. Of particular interest to the operator and engineer making inquiries in the field of underground coal mining are the following: In the Mechanical Division, the Electricity in Mines Section and the Mine Machinery Section; in the Mining Division, the Falls of Roof, Subsidence, and Air Movement Sections; and in the Explosives Division, the Research Section.

In Great Britain there have been valuable contributions by the Fuel Research Board and the Safety in Mines Research Board. An examination of the list of publications in 1928 by the latter board shows the following subjects receiving attention: Coal-dust explosions, redamp explosions, spontaneous combustion of coal, mining explosives, safety lamps, falls of ground, wire ropes, and mine temperatures.

In Germany, France and Belgium investigations on somewhat similar lines are being carried on and with special emphasis on safety.

In Great Britain notable work is being done by the British Colliery Owners' Research Association and by cooperation between the South and West Yorkshire Coal Owner's Associations and the Midland Institute of Mining Engineers. The result has been the publication of splendid reports on such subjects as conveying and loading by mechanical means and the use of iron and steel for underground supports.

In the United States the American Mining Congress is at work on a five-year program in the field of mechanical loading and related mechanization. The National Coal Association is financing various studies at educational institution. A number of colleges, universities, and mining schools are engaged in research work but most of them are directing their attention toward other types of problems than those properly classed as underground mining.

From year to year research fellowships in coal and non-metallics in cooperation with the United States Bureau of Mines are offered by various universities and mining colleges. One announcement of five fellowships for the year 1930-31 suggests three problems in coal, namely, Utilization of Coal, Beneficiation of Coal,

\* Vice President, Pittsburgh Coal Company.  
NOTE: This paper is based on subject matter discussed by Dr. Young in his talk before the Pittsburgh Section of the Coal Division of the American Institute of Mining and Metallurgical Engineers in Pittsburgh, April 28, 1930.



and Low-temperature Carbonization. Undoubtedly this should not be taken to mean that those who designate the problems to be studied have overlooked the underground problems, but rather that the material facilities for conducting the work and the personnel available for directing the studies are adapted rather to the laboratory type of problem than to underground work. The present administration of graduate study and research in most of the technical institutions does not admit of so-called practical studies which must be coordinated with the operating schedule of a mine as well as the curricula of a graduate school. If the technical schools are to play a part in "creative research" in coal mining it is suggested that serious consideration be given to the salient facts in mining research, namely, that the mine is the best laboratory and that such a working laboratory, to develop data of scientific and industrial value, must be operated under conditions similar to, if not duplicating, those in the going mine.

There is great need for more research of the type referred to as "field studies" and "field experiments." This should be conducted by the mining companies themselves under their own auspices and with their own officials and men. Many of the problems worth investigating require observations covering a long period of time. To secure the most reliable results there must be available cost data that represent not simply a set-up for a test but covering a period of production on a practical operating basis. Many times these studies can be made with the operating force and officials without disrupting the operating schedule of the mine. There are few tests made underground that exceed in value those made by the regular mine crew who are interested in the problem before them. The coal mining industry needs more research done with the aid of the practical operating men on the job who have been given an opportunity, because of their ability and loyalty, to apply their knowledge in the study of the more or less involved problems at the working face.

The engineering profession, the institutions of learning, the national and state mining departments, and the national mining associations may well direct their attention to research in underground mining. Brief bulletins and reports should be available to publish the results of fact-finding investigations which should show what has been tried, what has failed and why it has failed, and what has succeeded. These fact-finding investigations are work that the organizations just enumerated can sponsor in the future as they have in the past.

Cooperative investigations should be extended into the field of so-called "creative research" whenever possible, but

from the writer's point of view, the greatest need in the mining research field is the development of "research-mindedness" in more of the operating officials of the mine. It is not unnatural that mine bosses should be more or less aloof when new methods or new equipment are tried without consideration for their experience and judgment. The suggestions coming from the veteran at the face will frequently solve many problems. If the skill and talents of these men can be enlisted and their interest aroused, their cooperation will be assured and more data resulting from research work will be on a practical, and not on an artificial basis.

If "research-mindedness" can be developed more generally in the mining staff, there will be the greatest development of "creative research" the coal mining industry has ever known.

There are many coal mining problems on which we need research. Among those which have been suggested to the writer are the following:

- (1) Ventilation of gobs with special attention to the effect of falls and subsidence.
- (2) Methods of handling air at the face in order to secure the most economical use of fresh air.
- (3) More economic use of power by the elimination or the reduction of superfluous ventilation.
- (4) Face preparation for various types of mechanical loading devices.
- (5) Loading of machine cuttings coincident with the cutting operation.
- (6) Illumination of the working face in gassy mines.
- (7) Determination of maximum economic rate of advance of break lines in multiple shifting.
- (8) Study of cycles of operations to permit more rapid advance of face.
- (9) Study of ventilation problems incident to the rapid advance of face in multiple shifting.
- (10) Roof support in relation to mechanical loading and concentrated mining.
- (11) Methods of increasing and of determining the economic life of wire rope.
- (12) Power economies in long hauls underground.

Some very valuable work has been done along several of these lines but much remains to be done. In the opinion of the writer the operating companies, either singly or collectively, should undertake research along some of these lines, depending on their economic importance. If several operating companies carry on investigations on the same general subject they ought to be able to exchange data to their mutual advantage. This type of cooperative investigation presents many interesting possibilities.

## THE FLUORSPAR INDUSTRY IN 1929

As was to be expected in a year in which the steel industry, the chief consumer of fluorspar, made a record output, the fluorspar producers did a larger volume of business in 1929 than in 1928, according to a statement prepared by Hubert W. Davis, of the Bureau of Mines. The increase in shipments from domestic mines, however, did not keep pace with the increase in imports of fluorspar, notwithstanding an increase in the rate of duty on fluorspar containing not more than 93 percent of calcium fluoride.

A noteworthy accomplishment in the fluorspar industry in 1929 was the placing in commercial operation on March 18 of the flotation mill at Rosiclare, Ill., by the Franklin Fluorspar Co. At this mill acid-grade concentrates are recovered from mill tailings that heretofore were believed to be worthless. The mill feed in 1929 consisted of 11,868 short tons of mill tailings containing 60 percent, more or less, of calcium fluoride and the yield therefrom was 3,062 short tons of No. 1 concentrates suitable for use in the preparation of hydrofluoric acid and 575 short tons of No. 2 concentrates suitable for use in the manufacture of cement.

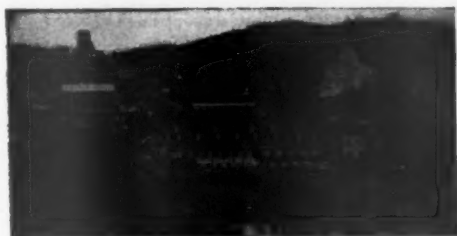
*Shipments.*—The shipments of fluorspar from mines in the United States in 1929, amounting to 146,439 short tons, consisted of 127,054 tons of gravel fluorspar, 8,325 tons of lump fluorspar, and 11,060 tons of ground fluorspar. The general average value for all grades per ton f. o. b. mines or shipping points in 1929, was \$19.06, 15 cents more than the 1928 average. The general average value of the fluorspar shipped to steel plants in 1929 from the Illinois-Kentucky district, was \$17.36 a ton and from the Colorado-New Mexico district \$12.69 a ton. This difference in average values represents chiefly economic factors in marketing rather than differences in quality of fluorspar from these two districts. Fluorspar was shipped from Colorado, Illinois, Kentucky, Nevada, and New Mexico in 1929, and each state, except New Mexico, recorded an increase.

The shipments of fluorspar to steel plants by domestic producers were 10 percent more in 1929 than in 1928, and there was an increase of 27 percent in exports of fluorspar in 1929. There were decreases in the shipments of fluorspar in 1929 to each of the other industries in which the mineral is used. The shipments of acid-grade fluorspar from domestic mines in 1929, though 19 percent less than in 1928, were equivalent to about 83 percent of the total fluorspar consumed in the United States in 1929 in the manufacture of hydrofluoric acid, whereas shipments of domestic acid-grade fluorspar in 1928 were equivalent to only about 78 percent of the total.

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## PRACTICAL OPERATING MEN'S DEPARTMENT

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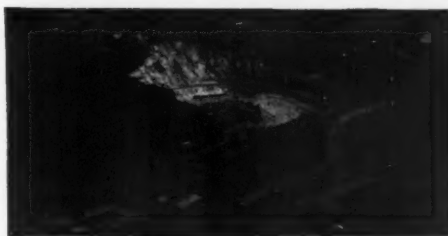


# METALS

GUY N. BJORGE

Editor

▼  
Practical Operating Problems  
of the Metal Mining Industry  
▼



By O. E.

**Simmons**

FOREMAN,  
LEACHING  
DEPARTMENT

## LEACHING and CEMENTATION

at the Copper Queen Branch Phelps Dodge Corporation

**H**EAP leaching is one of the cheapest, and probably one of the oldest methods of extracting copper from its ores. No reliable information is obtainable as to who first discovered this treatment of the raw ore. Articles have been written as early as the year 1752, wherein mention has been made of the production of cement copper at Rio Tinto, Spain. It is not thought, however, that this copper was produced from heap leaching; but was probably obtained from mine waters. Records available at the present time do not indicate when heap leaching made its first appearance. It is said that at Tharsis, in the province of Huelva, Spain, many years ago, one

of the mine officials, after a heavy rain, noticed colored water running away from a small pile of sulphide ore that had been dumped on the surface near the mine, and that on testing the water found that it contained a considerable quantity of copper. This led to experiments with the result that many million tons of ore are now being treated by this extremely simple process. At Rio Tinto the leaching ores are a dense sulphide containing approximately 48 percent sulphur and 1.5 percent copper. After the heaps are depleted of their copper content, the residual ore is sold on the market to chemical works for the manufacture of sulphuric acid.

According to the records, about the year 1900, Doctor James Douglas was impressed with the possibilities of this process for the treatment of Bisbee ores. Some experiments were made at that time on the heavy sulphide ores here. The ore was put into piles and water applied, after which the piles were allowed to dry and oxidize. The ores did not heat up as did those of the Rio Tinto. It being thought at the time that this heating effect was one of the principal factors necessary for extraction of the copper, the process was presumed to be a failure so far as Bisbee ores were concerned and the matter was dropped.

When churn drilling and sampling

were being done on the Sacramento Hill ore body, it was discovered that the ore varied considerably in grade, and that large quantities of silicious sulphide ore would be encountered of a lower grade than could be profitably treated at the concentrator. This presented somewhat of a problem at the time and the Research Department of the Phelps Dodge Corporation was set to work to devise a method of treatment for this class of material. Mr. A. W. Hudson, of the Research Department, assisted by Mr. J. Irving, Sr., conducted the experimental work. Considerable sums of money were spent on small and large scale tests, after which it was decided that the ore would be graded and that portion suitable for heap leaching would be placed in heaps especially constructed and arranged for efficient handling of the solutions.

In steam shoveling the Sacramento Hill ore body, the product was graded into four classes. The first class being direct smelting ore; second class, concentrating ore; third class, low grade or leaching ore; and the fourth class, waste. The leaching site was selected on account of the contour of the ground, and the nature of the floor, which consists of conglomerates and caliche. After clearing the site of brush and cactus, the ground was sealed with a covering of concentrator slime tailings approximately 2 in. thick. This was done as a precaution against loss of solution by seepage into the ground. A railroad spur was built along the north end. Dumping operations were commenced on this sloping ground south of the railroad, and as the dump increased, the track was thrown to the edge; the coarse rock rolling down to the toe of the dump and the fines hanging up near the top. The natural classification of the ore in this manner seems to have been ideal for heap leaching.

Fine ore on the top assists in a more uniform distribution of the leaching solution and allows the liquor to seep through the ore slowly. It also seems to lessen the chances of channeling and the formation of water courses.

Rock culverts were constructed ahead of the ore as it was dumped, a network of which covers the entire surface of the ground under the heaps, a selection of the hardest pieces of rock was made for culvert construction. The inside opening of all culverts is approximately 12 in. square; spacings range from 25 to 50 ft. apart, depending on the depth of the ore, the closer spacings being under the deeper ore. The culverts are used both for ventilating flues and drains for the solution.

Two heaps were constructed, namely, No. 1 and No. 2. The No. 1 contains approximately 2,000,000 tons of ore, the average grade of which is 0.89 percent copper. The No. 2 contains approximately 1,400,000 tons with an average grade of 0.68 percent copper. The total copper contained in the two heaps is estimated to be 54,433,000 pounds. The dimensions of the No. 1 are approximately 1,800 ft. long by 700 ft. wide with a depth on the lower side of 34 ft. The slope of the ground under the No. 1 heap is about 5 percent. The No. 2 is approximately 75 ft. deep on the lower side and is situated on steeper ground. The slope of which ranges from 6 to 10 percent. The surface of the dump is in the shape of a half moon, the maximum dimensions of which are about 1,400

by 600 ft. An average analysis of the ore in the two dumps is as follows:

COPPER									
Au.	Ag.	Acid Sol.	Total	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe.	CaO	S.	
Tr.	.10	.11	.51	61.8	11.5	8.8	0.1	8.5	

Irrigating basins have been constructed over the entire surface of both heaps which consists of borders about 8 in. in height built in 25-ft. squares and are used for confining the irrigating solution to different areas under treatment.

A system of launders serves to distribute the solutions on the heap. This consists of a main feed launder running the entire length of the heap with laterals branching off at right angles to the main launder at 150-ft. intervals. Small 6 by 6-in. portable launders take the solutions from the lateral and deliver it to the basins.

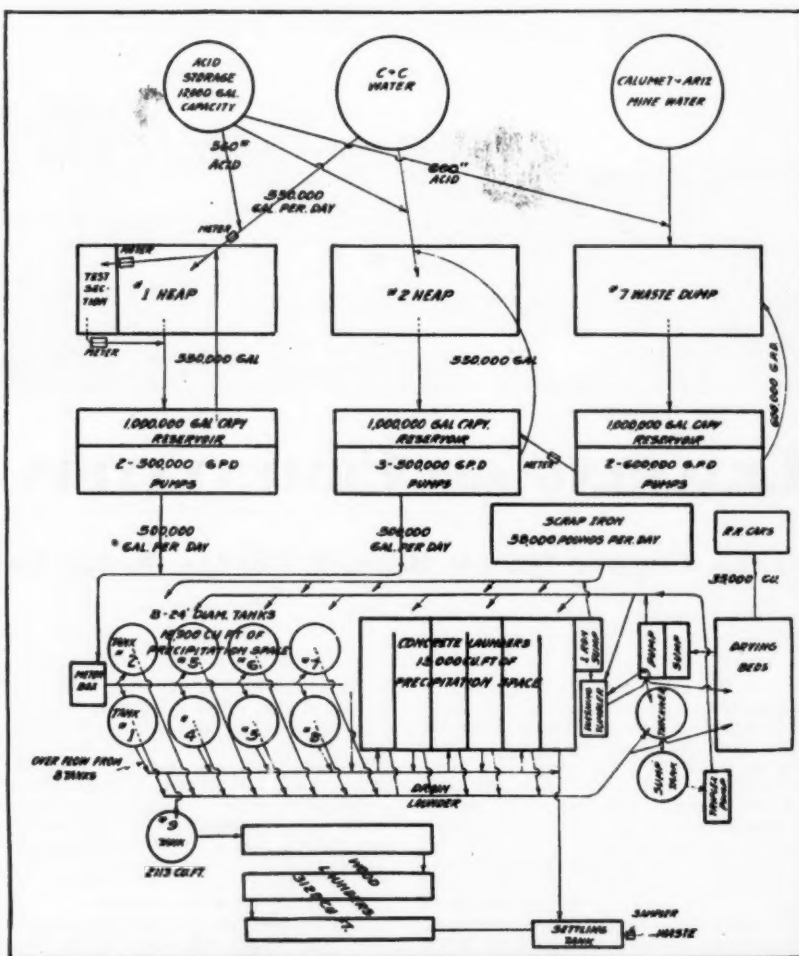
Flood water ditches were constructed above the heaps for protection in rainy seasons. Drain ditches traverse the lower sides of both heaps terminating in storage reservoirs of approximately 1,000,000 gallons capacity.

Leaching operations on the No. 1 heap were commenced on a small scale in September, 1924. At that time water from the Czar shaft was the only water available for leaching. This was conveyed to the leaching heap by flume over

a distance of 3.068 miles. Leaching operations were governed by the amount of water received at the heap.

During the latter part of 1927, additional water was available at the C. & C. shaft, which supplies water for the concentrator and it was decided to increase leaching operations. In April, 1928, large scale operations were started. The No. 2 heap was cut in and the Czar flume was discontinued completely, owing to the high cost of maintenance and the sufficient supply of C. & C. water available to carry on the operations. The water supply was taken from the mill storage reservoir and conveyed to a metering box on the edge of the heaps through a 6-in. wrought iron pipe line where it was metered by a V-notch recording meter before going on the ore. Approximately 550,000 gallons of fresh water were used on each heap daily. This water is slightly alkaline and is made neutral before going on the heaps by adding approximately three-quarters of a pound of sulphuric acid per thousand gallons of water. Sulphuric acid is received in tank car lots and stored in a 12,000-gallon acid storage tank above the heaps.

The water percolates through the heaps and drains into reservoirs below. Approximately 550,000 gallons daily of the liquor coming from each heap is



Flow Sheet, Don Luis Cementation Plant



pumped back to the top for a second passage through the ore. This is done to take advantage of the ferric iron as a leaching agent. Experience has proven that this hastens the extraction of the copper, eliminates the necessity of adding an excess of acid and a higher grade liquor is maintained.

Loss of solutions due to evaporation, soakage, etc., is from 15 to 18 percent. No account is taken for gains during the rainy seasons.

An average analysis of the solutions coming from the heaps is as follows:

RESULTS IN POUNDS PER 1,000 GALLONS				
Cu	Fe(ous)	Fe(ic)	Fe Total	Free H <sub>2</sub> SO <sub>4</sub>
40.00	12.0	45.0	57.0	0.5 to 3.0

After the ore has received the second washing the ferric iron builds up very rapidly. The ratio between copper and iron being as follows:

	Copper	Ferric Iron	Total Iron
1st washing.....	1.0	.46	1.02
2nd washing.....	1.0	.94	1.09
3rd washing.....	1.0	1.70	1.82
4th washing.....	1.0	1.84	1.90
5th washing.....	1.0	2.82	3.01
6th washing.....	1.0	2.88	3.03
7th washing.....	1.0	3.00	3.21

At the beginning of operations it was thought that the ferric iron would build up to a point where it would eventually become necessary to install sulfide beds or some other means of reducing the ferric before precipitating the copper. So far this has not become necessary. The ferric iron is very advantageous on the heaps as a leaching agent but tends to greatly increase scrap iron consumption in the cementation plant. So far scrap iron consumption has not been excessive. A sufficient amount of sulphuric acid is generated in the heaps to carry on leaching operations. This amount varies considerably at times.

A portion of the No. 1 heap has been set aside for experimental purposes and is leached separately from the remainder. This section contains 197,920 tons of ore, the original grade of which was .92 percent copper. The solutions are metered and sampled when going on and coming off, and a close check is made of the copper extracted, etc. This section has been under treatment since September, 1924, receiving 10 washings and yielding 1,847,459 pounds of copper or 50.73 percent of the original copper content.

Comparative washings are as follows:

	Pounds of Copper	% of Total
1.....	677,638	13.61
2.....	472,321	12.97
3.....	135,667	3.72
4.....	72,035	1.98
5.....	133,282	3.66
6.....	66,048	1.81
7.....	101,824	2.80
8.....	47,130	1.29
9.....	100,154	2.75
10.....	41,360	1.13
	1,847,459	50.73

At the beginning, in April, 1927, of large scale operations it was estimated that 30,800,000 pounds of copper could be extracted from the two heaps in five years. The following figures were derived from operation of the test section over a period of three years:

	Pounds
First year.....	10,800,000
Second year.....	8,000,000
Third year.....	6,000,000
Fourth year.....	4,000,000
Fifth year.....	2,000,000
	30,800,000

Total copper extracted from the Nos. 1 and 2 heaps to March 1, 1930, is 27,405,274 pounds. This represents 50.35 percent of the original total contained in the heaps. Copper extracted since April, 1927, is 20,799,872 pounds or 67.53 percent of the estimated 30,800,000 pounds for the five-year period.

No serious difficulties have been encountered. Percolation still continues good in the heaps.

During the latter part of 1929, the leaching department was faced with the serious fact that unless new resources could be found production would soon begin to drop off. There was nothing in sight to relieve this situation except the waste dumps, several of which had been built during the stripping operations on Sacramento Hill. The largest of these is the No. 7. This was constructed purely for the disposal of waste material, and no preparation was made for leaching. It was decided that in view of the very good results already obtained with the leaching heaps, this dump presented a favorable opportunity for a reasonable return on the investment.

The dump contains approximately 9,089,550 tons, the average grade of which is 0.26 percent copper, with an estimated copper content of 47,205,893 pounds gross.

Calumet and Arizona mine water is used for leaching and is taken from the Warren Ranch flume and pumped to a meter box on the dump where it is metered and sulphuric acid added before going on the ore. A considerable amount of suspended iron salts is present in this water, and just enough sulphuric acid is added to take them into solution, which is approximately 0.85 pounds per thousand gallons of water. If allowed to go on the ore in suspension, these salts tend to filter out on the surface and would eventually hinder percolation. The water is distributed on the dump in practically the same manner as on the No. 1 and 2 heaps. No basins were built. Two men are required on the dump for changing the water and building small irregular borders where necessary to keep the water from spreading too rapidly. The water drains from the dump into a reservoir where a portion is pumped back to the top of the dump for recirculation and the remainder pumped to the No. 2 heap reservoir, a distance of approximately two miles. Since the No. 7 dump operations were commenced no fresh water has been put on the No. 2 heap, No. 7 dump water being used exclusively for leaching this dump, after which it is pumped to the cementation plant.

Loss of water due to evaporation, soakage, etc., is very little more than on the Nos. 1 and 2 heaps, about 78 percent of the water is now being recovered, which is far better than was expected.

Leaching on the No. 7 dump was commenced in August, 1929, copper extracted to March 1, 1930, was 4,057,842 pounds.

Other waste dumps are now being prepared for leaching and if favorable results are obtained still others will be

attempted, and possibly by the time the dumps are exhausted the Sacramento Hill pit will be turned over to the leaching department for final completion.

The slogan of the leaching department for the last two years has been "one million pounds of fine copper per month." At least one more year of this production seems to be in sight.

#### CEMENTATION PLANT

The cementation plant as originally constructed, consisted of six redwood tanks 24 ft. in diameter by 10 ft. in depth, fitted with Dorr acid proof stirring arms suspended under a false bottom, and revolved by a shaft in the center of the tank. It was planned that this would provide agitation when necessary, and also serve to move the deposited copper to the central discharge cone on the bottom of the tank. Five wooden launders measuring 3 by 3 ft. by 150 long were used for cleaning the tail liquor from the tanks. The plant contained 17,915 cu. ft. of precipitating space. The tanks were connected in series. The flow entering the No. 1; overflow from the No. 1 going to the No. 2; and so on through the plant. The copper was sluiced from the plant with high pressure water, going direct to a Dorr acid proof classifier where the coarse copper was deposited on drying floors and the fine copper going to a Dorr acid proof thickener, after which, the thickened slime was pumped to drying floors. When sufficiently dry, the cement copper was shoveled into mine cars and trammed to the railroad spur where it was loaded into cars for shipment to the smelter.

The plant capacity was approximately 250,000 gallons of liquor per day. Monthly copper production ranged from 100,000 to 200,000 pounds.

Heavy scrap of all description was used in the tanks and clippings from can factories were used in wood launders. A 5-ton Gantry crane was used for handling the heavy scrap.

When increased production was decided upon from the heaps, it became necessary to increase the size of the cementation plant. It was proposed that the plant have a capacity of 1,000,000 pounds of copper per month. For this production, it was necessary to treat approximately 1,000,000 gallons of liquor daily.

The new construction consisted of erecting two new tanks, identical in design to the tanks already in operation with the exception of the stirring mechanisms, which were removed from all tanks. These mechanisms had never been satisfactory and were merely occupying valuable precipitating space. Six new concrete launders of the Inspiration type, measuring 10 ft. wide, 5 ft. deep and 55 ft. long, were constructed between the extended crane rails. A 4 by 12-ft. trommel screen which had been discarded from the old test mill was placed at the tail end of the concrete launders for separating the iron and copper. Two No. 7 Roots blowers which had been discarded from the Nacozari mill were secured and installed for agitating the solution in tanks and launders. The crane was equipped with a ¼-vd. Brosius patent single line clam shell bucket and a 45-in. lifting magnet. The drying bed capacity was doubled and the railroad spur moved nearer. A drag line scraper was (Continued on page 538)

# Flow Sheet of Copper Smelting

**Douglas Reduction Works, Douglas, Arizona**

By R. H. Mills

INVESTIGATION  
DEPARTMENT

THE ore receipts at the Douglas Smelter fall into six general classifications: concentrates, oxide ore, sulphide ore, silicious ore, precipitates, and miscellaneous custom ores. The custom ores may be disregarded as they represent only a small fraction of the total.

Some typical assays of the remaining five classes, taken at random, but being fairly representative, show about as follows:

Class	Cu.	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe	CaO	S
C. Q. flotation concentrates.....	13.40	8.2	2.5	32.6	0.4	40.1
C. Q. sand concentrates.....	9.35	6.8	1.8	36.8	0.4	44.6
Moctezuma concentrates.....	23.62	10.8	4.0	26.9	1.0	29.8
Sulphide ore.....	4.13	25.7	9.3	24.2	1.9	21.0
Oxide ore.....	5.93	20.6	7.0	24.2	8.2	1.8
Silicious ore.....	3.63	64.6	8.3	8.6	0.4	9.6
Precipitates.....	63.12	1.8	4.0	8.6	0.2	1.7

As given above the ores and concentrates contain copper, silica, alumina, iron, lime and sulphur. They also contain many other elements such as gold, silver, lead, manganese, zinc, etc., but which are in such small quantities that they do not need to be considered. Of course, the gold and silver are valuable and must be recovered, but they follow the copper and appear in the bullion along with it. Smelting is a process of

the concentrate is removed by literally boring holes in the concentrate and removing the displaced material in a can provided for that purpose.

Second—The ore is sampled while being unloaded (which is done by contract labor by hand shoveling). Every tenth shovelful is kept for a sample.

These samples are taken to the sample mill where they are crushed and divided until an assay pulp is attained. These pulps weigh approximately 16 oz. These are sent to the assay laboratory where the contents are accurately determined.

Now in order to smelt this ore economically it must be mixed thoroughly in such proportions as will give the desired metallurgical result. To obtain the desired mix the ore is unloaded into six beds. Two of these beds have a capacity of 30,000 tons each, and four have a capacity of 20,000 tons each.

A typical bed analysis shows:

Cu., 9.07; SiO<sub>2</sub>, 22.0; Al<sub>2</sub>O<sub>3</sub>, 7.2; Fe, 25.4; CaO, 1.9; S, 24.5.

When a bed is ready to be smelted the ore is picked up by steam shovels and loaded into dump cars in which it is transported to the crushing plant where it is dumped into an unloading pocket. From there it is delivered via an apron conveyor and a belt conveyor to the gyratory crusher where it is crushed to a 3-in. maximum. From the gyratory it is taken on another belt conveyor, under an electro magnet to remove tramp iron, to the primary rolls where it is crushed to a 1½-in. maximum. From these rolls via another belt conveyor to the secondary rolls where it is crushed to a ¾-in. maximum and delivered on another conveyor belt to Western dump cars. These are hauled to the unloading bins and taken up an inclined conveyor belt to the storage bins, one of which is above each roaster. These bins have a capacity of approximately 150 tons each.

The Queen superimposed roaster-reverberatory plant is more or less of an innovation in copper smelting (Figure 1). The ore is first hoisted to the top of the building as described above. From there it descends through the roasters to the reverberatories entirely by gravity without handling or haulage. This reduces labor and power costs and by taking calcines directly from the roasters, a much hotter calcine is obtained for the reverberatories and a heat loss is thereby avoided thus increasing reverberatory capacity, and cutting fuel cost per ton of charge smelted.

The new Queen plant has two reverberatory furnaces, the inside dimensions of which are 92 ft. 3 in. long, and 23 ft. 6 in. wide. Above these are superimposed 12 Queen type 11-hearth roasters, 6 above each reverberatory (Figure 2).

Each roaster consists of one outside drying hearth followed by 11 interior hearths over which the ore travels alternately towards the center and towards

elimination and the description which follows will show how the unrecovered elements are eliminated.

When the ore arrives at Douglas it contains moisture. Therefore a careful sample is taken, weighed and dried and from the loss in weight the percentage of moisture is determined. The cars are weighed as they come in, the percentage of moisture is applied to the wet weight, and the dry weight is determined. From then on, only the dry weight is considered for any purpose.

For obvious reasons a sample, other than moisture, must be taken to determine the contents of each lot of ore arriving at the smelter. This is done in two ways:

First—Concentrates are sampled by the auger method, whereby a quantity of

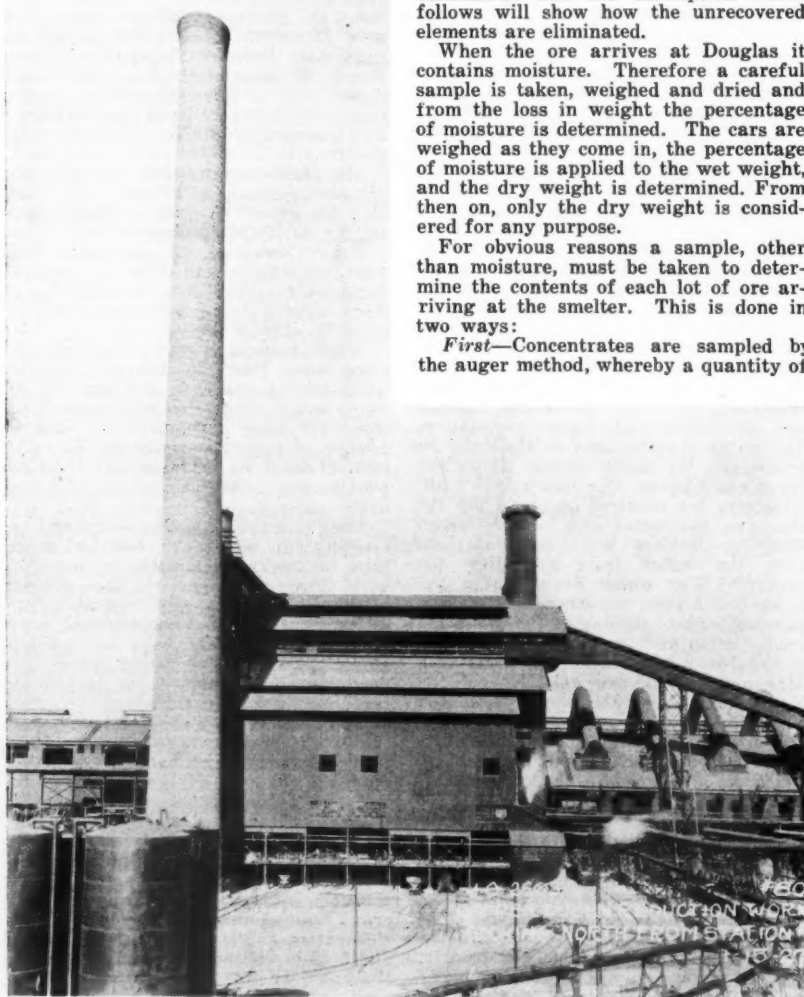


Figure 1—Copper Queen Reduction Works, looking north

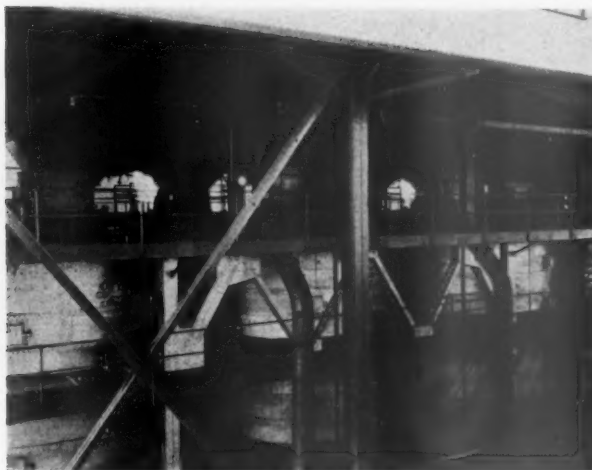


Figure 2



Figure 3

the outside. The ore is moved in this fashion by rabble teeth on an air-cooled arm which is revolved by an air cooled center column.

The ore is fed from the storage bins to the outside drying hearth by an apron feeder actuated by a lever arm from the revolving center column.

The purpose of a roaster is threefold, to eliminate sulphur, to dry the ore and to preheat the ore. The average bed mix as fed to the roasters will contain from 4 to 8 percent moisture. In traversing the outside drying hearth a part of this moisture is driven off. Then in the top hearths of the roaster the balance is eliminated and the ore is gradually getting hotter and hotter until the sulphur ignites and begins to burn. Combustion continues until by the time the eleventh hearth is reached the temperature has reached 1,100° F. or more, depending on conditions. On the ninth, tenth, and eleventh hearths are two air arms in addition to the two rabble arms. These are attached to the center column at right angles to the rabble arms. These arms are slotted and allow the air to escape into the roaster which has previously been used to cool the rabble arms in the column. This furnishes the preheated air to support the combustion of the sulphur. The hot gases ascend through the roaster and transfer their heat to the descending ore and the cycle is complete. Once started the roaster is self-sustaining, the sulphur in the ore being all the fuel required for normal operations. Occasionally it is necessary to burn some oil, as in starting up after a protracted shutdown or due to excessive moisture such as we had following the heavy rains in July and August.

The ascending gases pass up a 4-ft. diameter circular uptake into a bustle line which connects all roasters together. From this bustle line the gases which contain some dust pass into the Cottrell plant.

This dust is valuable in that it contains copper and steps must be taken to recover it. An analysis of Cottrell dust shows: Cu, 15.35; SiO<sub>2</sub>, 7.2; Al<sub>2</sub>O<sub>3</sub>, 3.7; Fe, 25.3; CaO, 0.4; and S, 19.7. For this purpose we have the Cottrell plant. It consists essentially of 8 units, 4 above each set of 6 roasters (corresponding to one reverberatory). Through these the

gases must pass in order to get to the stack. In the center of each of these pipes is suspended a wire carrying approximately 50,000 volts of electricity and entirely insulated from any ground. The flow of current from the wire to the grounded pipe carries the dust to the pipe where it is deposited. From time to time the pipes are rapped with pneumatic hammers which jar loose the dust and it falls into hoppers below and is carried by pipes to screw feeders on the reverberatories below. The ascending gas, having been cleaned of the dust, is conducted through a balloon flue to the stack, 351 ft. high, 17 ft. diameter and thence to the atmosphere.

When the calcines arrive on the eleventh hearth of the roaster they analyze as follows:

Cu, 9.48; SiO<sub>2</sub>, 23.8; Al<sub>2</sub>O<sub>3</sub>, 7.1; Fe, 28.9; CaO, 2.1; S, 13.3.

This constitutes the bulk of the charge to the reverberatory furnaces.

The eleventh hearth of each roaster is provided with a number of drop holes through which the calcines fall into pipes which carry the calcines to the charge hoppers.

These hoppers are 65 ft. in length and are arranged one on each side of the reverberatory furnace and extending from the firing end toward the skimming end. On the bottom of these hoppers are 26 charge pipes 6 in. in diameter spaced at intervals of 30 in., leading down through a hole in the reverberatory arch roof. The calcines pass down these pipes and pile up along the side walls of the furnace leaving a channel down the center.

At the firing end of the furnace are arranged 10 oil burners burning approximately 425 barrels of fuel oil each 24 hours. Air for atomizing this oil is furnished by the old blast furnace blowers at 42 ounces pressure. Secondary air for combustion is admitted through the holes in which the burners are inserted, which are 9 by 15 in.

The hot gases and products of combustion pass down the channel between the banks of calcine heating them to a temperature of approximately 2,400° F. This is far above the smelting temperature and the charge readily smelts and runs down into the center as a liquid which consists of matte and slag. Matte

is a combination of Cu., Fe and S in various proportions, depending on the amount of copper and sulphur present and is much heavier than the slag, which is mainly a silicate of iron.

The specific gravity of matte is about 5.0.

The specific gravity of slag is about 3.5.

Thus it is readily seen that in liquid form and given a certain time the matte will settle to the bottom and slag come to the top, just as cream separates from milk.

The matte is tapped out from time to time through a small hole near the bottom of the furnace.

A typical analysis of matte is as follows:

Cu, 30.24; Fe, 39.6; S, 25.7.

The slag is skimmed off the top through a small door into launders which convey it to the slag pot in which it is hauled to the dump (Figure 3).

A typical slag analysis is as follows: Cu, 0.41; SiO<sub>2</sub>, 37.6; Al<sub>2</sub>O<sub>3</sub>, 9.8; FeO, 46.3; CaO, 2.2; S, 0.4.

The hot gases from the oil burners after passing between the charge banks and smelting them are carried by an uptake to four Erie City vertical tube type boilers. They are rated at 520 hp. each. The gases enter the boilers at 2,000° F. and emerge at about 650° F. Each boiler has an uptake which the gases pass to a balloon flue and thence to the stack.

Draft is maintained at a low point at all times so that these gases do not contain a great amount of dust and no dust collecting apparatus is necessary. However, the dust coming down from the Cottrells in pipes is very fine and to avoid causing a great deal of dusting at the time of its dropping into the reverberatory it is fed into the furnace through a motor driven screw feeder, which pushes the dust through a small opening in the sidewalls of the furnace, one on each side of each reverberatory.

When the matte is tapped from the reverberatory it flows down cast iron launders to a ladle which will hold about 14 tons. This ladle is provided with a bail and is picked up by an electric crane and taken to the converters.

The converters are eight in number and stand side by side on the opposite



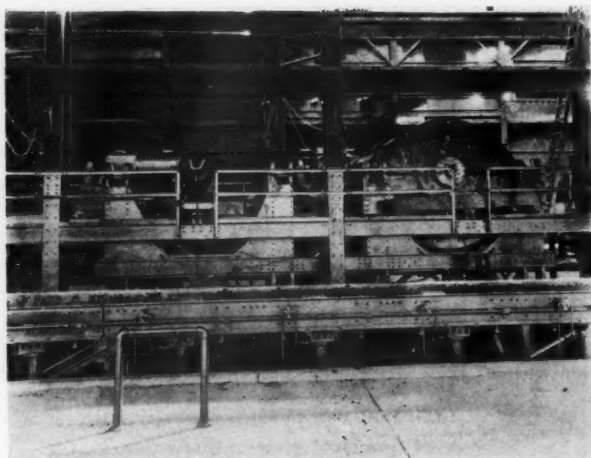


Figure 4

side of the crane aisle from the reverberatories. They are of the Great Falls or upright type and are 12 ft. in diameter, lined with 15 in. of magnesite brick. The matte is poured into them from the ladle suspended from the crane. From the analysis of the matte it will be seen that everything has been eliminated from the copper except iron and sulphur. These are eliminated in the converters in two stages. First, the iron and some of the sulphur is removed. This is done by adding silica to the matte in the converter and blowing compressed air into the matte below the bath line. This serves to agitate the mixture and at the same time the oxygen in the air will combine with some of the sulphur and the iron from which the sulphur has been taken, and thus keep up the temperature during the reaction between the silica and the iron, which also evolves heat. This forms a slag which being much lighter than the copper sulphide remaining, comes to the top in the same way that the slag comes to the surface in the reverberatory.

A typical analysis of converter slag is as follows:

Cu, 2.76; SiO<sub>2</sub>, 19.4; Fe, 54.7; S, 1.5.

When this reaction is complete the slag is skimmed off into a ladle, another ladle of matte is added, more silica, and the mixture is blown as before. The slag that has been skimmed off into the ladle contains too much copper to throw away, so it is picked up by a crane and taken back to the reverberatories where it is poured into the molten bath. As a means of effecting this the reverberatory is supplied with a launder ending in a well in the reverberatory arch roof, down which the slag is poured. After being reintroduced into the reverberatory the converter slag mingles with the reverberatory slag bath at a temperature which keeps it molten and allows the copper sulphide to settle to the bottom and join the matte.

After the converter has received and formed slag from (usually) four ladles of matte and the last slag has been skimmed off we have sufficient copper

sulphide remaining to make a charge of copper. This copper sulphide remaining is known as white metal. The converter is turned up and the air is blown through until all the sulphur has been eliminated. Now all we have left is copper. This is in the form of blister copper.

An analysis of a typical sample shows:

Au, 0.44 oz.; Ag, 18.06 oz.; Cu, 99.27; S, 0.049; O<sub>2</sub>, 0.30.

In handling all this molten material in ladles, a great deal of shell forms in the ladles which are generally known as skulls. These must be knocked out occasionally or they would build up indefinitely until the ladle would hold no liquid. For this purpose we have a skull breaker, which is nothing but a large grating so mounted that small dump cars can be run beneath to receive the skulls. The ladles are shelled by bumping them (while held by a crane) against an old ladle placed on the grating. The shell easily falls out, since the ladle has previously been treated with a lime wash. An apparatus similar to a small pile driver running on a track above the grating is spotted over the dumped shells and breaks them up sufficiently so they will fall through the gratings into the cars below, which are hauled out as filled and returned to the system to recover the copper which is contained in them.

From the analysis of the blister copper it is apparent that it needs further refinement before it is pure copper. For the making of pure copper, the electrolytic process is used. The new Nichols Copper Company's refinery at El Paso receives the product of the Copper Queen Smelter. This is shipped to El Paso in the form of anodes all ready for the electrolytic tanks. An anode is a flat plate, the main body of which is 36 in. by 36 in. and 1½ in. thick. Two lugs for suspension project about 5 in. on each side at the top. One of these lugs is cast with the Baltimore insert groove for the cathode rod. The other one is a solid supporting lug. Each anode weighs 700 lbs. with a permissible range of 5 percent heavier or lighter.

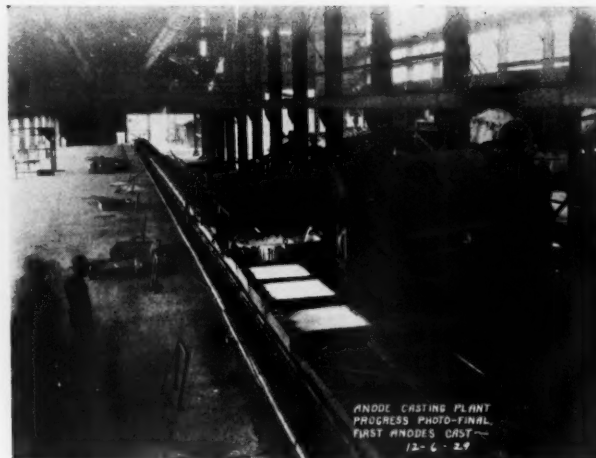


Figure 5

In order that this anode may be flat, smooth, and suitable for electrolytic refining it is necessary to remove the sulphur and oxygen. This is done in the new anode plant devised by Col. H. H. Stout, which consists essentially of two cylindrical vessels lined with magnesite brick, a number of moulds and required handling equipment (Figure 4.)

The first vessel is known as the oxidizing vessel and receives the charge of blister copper as it comes from the converter. This copper is then blown with a ¾-in. iron pipe connected by a hose to a source of 90 lb. air. This oxidizes the sulphur and drives it off in the form of SO<sub>2</sub> gas. It also results in the oxidation of some of the copper so that when the operations in the oxidizing vessel are complete the bullion will analyze about as follows:

Cu, 99.15 percent; O<sub>2</sub>, 0.65 percent; S, 0.005 percent.

The charge is then heated by a small oil burner and poured down a short launder into the reducing vessel which is identical in construction with the oxidizing vessel except that it is mounted on trucks and moves on a track. The charge of copper is then reduced by introducing a green aspen pole which reduces the oxygen in the charge which comes off as a gas mostly CO. The bullion now analyzes about as follows:

Cu, 99.65 percent; O<sub>2</sub>, 0.11 percent; S, 0.0013 percent.

The charge is now ready for casting. The temperature is of considerable importance in casting. If the temperature is too low the charge is heated with a small oil burner, taking care to get a neutral flame.

Fifty moulds are arranged on a rack parallel to the track upon which the reducing vessel travels (Figure 5). The copper is poured from the vessel through a spoon to the mould and allowed to cool. They are then raised by a crane and set down on the platform. They are there inspected carefully for defects and the accepted ones loaded into cars for shipment to the refinery.

## NEWS OF THE MINING FIELD

### Tonopah Mining Stockholders to Vote on Reorganization

A special meeting of stockholders of the Tonopah Mining Company, of Nevada, has been called for June 23 to act upon a plan of reorganization and readjustment of the capital structure of the company. The proposals include: Reduction of the capital stock from \$1,000,000 to \$500,000, par value \$1; sale and transfer of all assets of the Tonopah Mining Company to the Tonopah Corporation and offering of 100,000 shares of stock of Tonopah Corporation to Tonopah Mining stockholders at \$5 per share, and to use proceeds to pay stockholders 50 cents a share in reduction of capital stock of the company.

At the annual meeting of the stockholders of the company on May 13, Walter L. Haehnlen, president, recommended partial liquidation of the company. He pointed out that since the close of the company's fiscal year, December 31, 1929, conditions had constantly gone from bad to worse.

"Owing to the steady decline in the price of silver from 57½ cents in January, 1929, to 39½ cents in March, 1930, we were obliged on February 26 to close down the Tonopah mine," Mr. Haehnlen stated.

"The old Tonopah mine had been in operation for nearly 30 years. It has been a wonderful property, returning to its stockholders close to \$17,000,000 in dividends.

"For a number of years your management has been endeavoring to find a new property to take the place of this one, but repeated efforts have met with no success. At the present time all the properties owned by your company are shut down.

"It is the feeling of the management that no further large sums should be spent in attempts to secure new properties, and request of certain stockholders for partial liquidation of the company should be given serious consideration."

### St. Joseph Lead Company To Build Zinc Smelter in Pennsylvania

The St. Joseph Lead Company has acquired about 150 acres of land on the Ohio River near Monaca, Pa., on which it will erect a zinc smelter costing between \$2,000,000 and \$3,000,000, accord-

ing to an announcement made by the company early in May. It is expected that the plant, which will employ around 150 men, will be ready at the end of this year, or early in 1931. Contract for the construction has already been let.

The smelter is the first of its kind to be built by the company, and will produce both zinc metal and zinc oxide, using the electrothermic process of treating the ore. The company's mining properties are located in the Tri-State District, and in St. Lawrence County, N. Y., where zinc mining operations were recently started.

### Canadian Copper Refinery To Cost \$3,000,000

An announcement of financing in connection with the erection of an electrolytic copper refinery at East Montreal, Quebec, by Canadian Copper Refiners, Ltd., states that the plant, including land, will cost approximately \$3,000,000. The plant is being constructed primarily to refine the copper produced at the smelter owned and operated by Noranda Mines, Ltd., but it will also operate as a customs refinery.

It is estimated that the Noranda smelter alone will provide not less than 50,000 tons of copper annually. In addition, Hudson Bay Mining & Smelting Company has contracted for treatment of copper from its Flin Flon, Manitoba, properties, estimated to commence at about 15,000 tons a year.

Construction of the new refinery is to be begun before the end of May and it will probably be ready for operation by January, 1931. The undertaking is a joint project of Noranda Mines, Ltd., British Metal Corporation, Ltd., of London, and Nichols Copper Company.

### Tri-State Mill Men Organize—Adopt Definitions of Metallurgical Terms

Metallurgists and mill men of the Tri-State District formed recently the Tri-State Metallurgical Association. The association will hold weekly meetings at Picher, Okla.

A list of definitions of metallurgical terms was tentatively selected by a committee appointed by Elmer Isern, chairman, in order that in future papers to be prepared for the meetings all of the members will know exactly what is meant when these terms are used. It is hoped

especially to encourage the use of the term "concentrate" instead of "ore." The definitions follow:

1. *Ore*—Mineralized rock or earth material which is or may be mined for metallurgical treatment. Ore is locally termed "rock" or "dirt."

2. *Concentrate*—The product recovered from any ore concentrating operation. Concentrate is locally termed "ore."

3. *Heads*—Feed material for any ore concentrating operation.

4. *Tailings* (or Tails)—The product discarded from any ore concentrating operation.

5. *Middling*—An intermediate product from any ore concentrating operation which is subject to further treatment.

6. *Smittem*—A local term describing the hutch product of a roughing jig.

7. *Chat*—A term used locally to describe fragments or particles of ore containing interlocked minerals with or without gangue.

8. *Recovery*—A local term for the percentage, by weight, of concentrate produced from ore.

9. *Ratio of concentration*—Ratio of weight of ore to weight of concentrate produced. It is the reciprocal of recovery as understood locally.

10. *Extraction*—That percentage by weight of any given metal or mineral in the heads which is recovered in any metallurgical operation.

11. *Percentage distribution*—The percentages by weight of the total quantity of any given metal or mineral in the heads that are contained in the several products of any metallurgical operation.

### New Five Compartment Shaft at Newport Iron Mine

A new five-compartment shaft is to be sunk at the Newport mine of Pickands, Mather & Company at Ironwood, Mich., preliminary work already being under way. It will be sunk on an incline to a depth of about 2,700 ft., and where necessary will be concrete lined. The shaft will have a steel headframe and will be electrically operated. It is estimated that three years will be required to complete the shaft and have it ready for operation. A new power house, shops, and change house will also be erected.

The Newport is one of the largest underground iron mines of the Lake Superior District.

### Accurate Data Advocated for Stabilization of Metal Prices

One of the major factors for forwarding the stabilization of metal prices according to the Minerals Division of the Department of Commerce, would be an accurate knowledge of the manifold uses of metals, adequate statistics on consumption by these uses and the understanding of the interrelation of metals one with another, not only as to their physical as well as chemical properties, and the properties they impart to their alloys, but also the price at which substitution might take place.

"In other words," says the division, "an accurate statistical knowledge as to consumption which should as a necessity include such items as visible stocks, should be available. A factor of possible equal importance is the necessity of maintaining intensive research work directed along the lines of maintaining the consumption in any specific use and by creating new uses in order to offset in part any curtailment involved by the falling off of demand in any one use, thus providing new channels for consumption."

"From 1922 to 1928 the demand for an ever-increasing quantity of copper, lead and zinc led to a corresponding increase in world's production. The absence of detailed accurate statistical data regarding the consumption of these metals and the attempt to empirically determine anticipated demand has led to rather wide fluctuations of price as well as to the accumulation of large stocks. These conditions taken in conjunction with the capacity to produce, which was built upon previous rather than a knowledge of prospective consumption, has made curtailment or, in reality, adjustment in production necessary in order to decrease the balance between production and consumption."

"The question as to whether curtailment of production will or will not stabilize price is a very debatable one, and without accurate statistical data as to consumption by uses it would apparently be a mere matter of more or less intelligent guessing. In order that some of the wide fluctuations in price should in part be eliminated, it would appear evident that curtailment in production must actually be anticipated before any appreciable decrease in consumption takes place."

"A theory has been advanced by certain large metal producers that in order to level out the peaks and valleys of high and low prices, that a latent capacity for production should ever be maintained by the producer in order to meet any sudden demand for their product. The cost of maintaining such capital investment would be reflected in the price at which the commodity is sold."

"The advantage claimed for this scheme is that in the long run where consumption is based not only upon established uses but also upon those created by research work, that the industries so established are in a far more stable position than those in which there has been little attempt made to forecast future production and in which the empirical method has been customary."

### Appeal Granted in Case Involving Lead Lost in Smelting Imported Ores

The United States Court of Customs and Patent Appeals has approved a petition filed by the Government, through the Assistant Attorney General, New York, for a review of the case of the Consolidated Kansas City Smelting & Refining Company and the American Smelting & Refining Company vs. the Collector of Customs, involving the duty on lead lost in smelting for free metals. The Government contends that the United States Customs Court, Second Division, erred in holding recently that under Section 312, tariff act of 1922, the lead found in the ores in question was not dutiable, since it was lost in smelting in bond, and in not holding it dutiable at 1½ cents per pound under paragraph 392.

### Brownell Heads A. S. & R. Board

F. H. Brownell, president of the Federal Mining & Smelting Company, was recently elected chairman of the board of directors of the American Smelting & Refining Company, succeeding Edgar L. Newhouse, who has resigned after being associated with the company for more than 40 years. Mr. Newhouse will continue to serve as a director of the company.

### Tariff Regulation Upheld

The Court of Customs and Patent Appeals, in a decision rendered recently, upholds section 316 of the tariff act of 1922, which grants the President power to fix import duties on commodities or even exclude them from entry into the United States whenever he finds unfair business methods to exist in the importation of such commodities. The court held that the granting of this power to the President does not constitute such a delegation of legislative power as would render his action thereunder unconstitutional. When acting under the statutory provisions, with the aid of the findings and determinations of the Tariff Commission, the President does not determine matters of tariff policy which are reserved to the Congress, the opinion stated.

This case resulted from a complaint

filed in 1925 by the Bakelite Corporation. The company sought the exclusion from importation of material and articles made of synthetic phenolic resin, claiming an injury to its business under patent monopoly by alleged unfair competition in the importation and sale of such articles. Following the recommendation of the Tariff Commission, the President issued a temporary order excluding the articles from entry and a number of importers appealed to the court.

### Idaho Company Completes Flotation Plant

The Pine Creek Lead-Zinc Company has completed a 250-ton flotation mill at the Little Pittsburgh property, near Kellogg, Idaho, and it is expected that the plant will go into operation the moment metal prices and markets are more favorable. The crushing capacity of the mill is in excess of the rated capacity in anticipation of enlarging the plant, which is designed for the recovery of both lead and zinc.

### "The Price of Silver"

A 21-page bulletin entitled "The Price of Silver" has been issued by the Bureau of Foreign and Domestic Commerce of the Department of Commerce. It discusses causes of price fluctuation, relation to prices of other commodities, effect of price of other metals, price-determining factors and methods, recent price fluctuations, supply, demand and production. The study was prepared by Herbert M. Bratter, of the Finance and Investment Division, and is issued as Trade Information Bulletin No. 682.

"The decline in the price of silver is of interest not only to American producers of silver, both at home and abroad, but also to Americans engaged in trade with the silver-producing and silver-using countries," says the bulletin. "For a time it was hoped that China, a major silver-using country, would soon be able to effect financial reorganization, but in view of the slump in silver the realization of that hope may again be delayed. Mexico has been hard hit by the decline; Canada, an important silver producer, is also concerned. The present low silver price is an impediment to the recently initiated currency reform in India. Moreover, producers of copper, lead, and zinc normally derive a portion of their profits from silver; the loss of their profits affects not only those producers, but, eventually, everyone who in any way uses copper, lead, or zinc."

"The instability of the price of silver has long been a disturbing influence in international trade. In the case of silver-using countries, it often subjects profits



of foreign trade to partial and even complete depletion. Because of this fact, trade with those countries is frequently reduced to a speculative basis. Another unfortunate effect is that commodity prices within a silver-using country must be readjusted frequently, especially where foreign trade is an important part of the country's business.

"Silver has been discarded as a standard of monetary value in the principal countries of the Occident, while in the Orient, India, Siam, the Straits Settlements, the Netherlands East Indies, and the Philippines have all pegged their currencies to gold. Recently, Indo-China linked its piaster to the French franc, while Persia and Hong Kong are both considering the advantages of the gold standard. Japan, as early as 1897, went on the gold standard, extending its currency system to Taiwan and later to Chosen.

"While a decline in the price of silver is sufficiently disturbing to China and India, and to the countries which trade with them, the habitual instability of silver is even more generally disturbing. The stabilization of silver would be a boon to traders the world over, but the metal will probably continue to play its historic role of prince and pauper."

#### Daveler Takes Position with Utah Copper and Nevada Consolidated

Erle V. Daveler, of Butte, Mont., general manager of the Butte & Superior Mining Company, has been appointed manager of the New York office of the Utah Copper Company and the Nevada Consolidated Copper Company. While he will live in New York, he will retain his present position with Butte & Superior, but the local supervision will be in the hands of H. D. Cooley, assistant manager.

#### Berrien and Carrigan Get New Anaconda Posts

Chauncey L. Berrien, who has held the position of general superintendent of mines for the Anaconda Copper Mining Company, has been made assistant manager of mines, and James J. Carrigan, formerly chief assistant superintendent of mines, becomes general superintendent, effective May 1. Mr. Berrien has been with Anaconda for 28 years, having worked in the company's mines during his student days. Mr. Carrigan also has a long record of service, having taken his first position with the company in 1907.

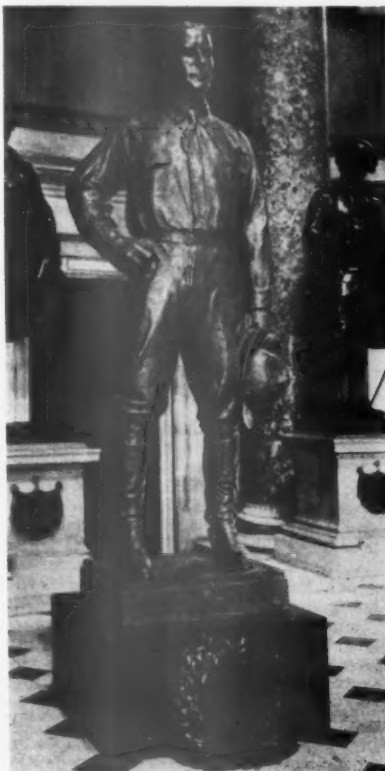
*Statue of Gen. Greenway, recently placed in the Nation's Capitol at Washington*

#### Greenway Statue Unveiled in Capitol at Washington

A memorial to the late Gen. John C. Greenway was unveiled in Statuary Hall in the Capitol Building at Washington, on May 24, as Arizona's contribution to the National Hall of Fame. It was the first statue to be placed there of a veteran of the World War, and also is unusual because it stands only a few feet from the statue of Gen. Greenway's great-great-grandfather, Dr. Ephraim McDowell, which was placed in Statuary Hall a few years ago by Kentucky. The high character and accomplishments of Gen. Greenway, who distinguished himself in the Spanish-American and World Wars, were described by the following speakers: Senators Ashurst and Hayden, Arizona; Robinson, Arkansas; Gen. J. G. Harbord, Rep., Douglas, Arizona; and Rep. Connery, of Massachusetts.

Gen. Greenway served with Roosevelt's Rough Riders during the Spanish-American War and was decorated for gallantry in action. When this country entered the World War he enlisted and went to France. He was decorated with the Distinguished Service Cross by his own country, and received the Croix de Guerre with two palms from the French Government. At the time of his death, in 1926, he was general manager of the Calumet & Arizona Mining Company and the New Cornelia Copper Company.

Gen. Greenway's young son, Jack, unveiled the statue at the exercises.



#### Reduced Fire Hazards and Insurance Rates Aim of Tri-State Survey

In an effort to bring about a reduction in fire hazards and to attempt to effect a reduction in fire insurance rates on the mills in the Tri-State District, the Tri-State Zinc & Lead Ore Producers' Association is making a general fire survey of the Oklahoma-Kansas area, according to M. D. Harbaugh, secretary.

Each mill in the affected area will be examined to ascertain if there is an adequate water supply readily accessible to fire trucks, and if this supply is located far enough away from the mill so that it will not be cut off in case of fire.

An inventory of the fire-fighting equipment of the district will be made and a table made which will show the time necessary for such equipment to reach each plant. A map will be made showing the roads to each plant.

#### Tri-State Safety Contest Postponed

Owing to the unsettled condition of the mining industry in the Tri-State District and Arkansas, which made it difficult to obtain sufficient teams to justify the holding of the Four-State Mining and Industrial First-Aid Contest, the contest, which was to have been held in Joplin on May 24, has been postponed, according to Frank Fenix, Missouri state mine inspector and chairman of the contest committee.

An effort will be made to hold the contest in the fall when the coal mines are active and conditions in the zinc and lead industry, it is hoped, are improved.

#### Michigan Tech Graduating Class Largest in History

The 1930 graduating class at the Michigan College of Mining and Technology is the largest in the history of the institution, according to the list of candidates for degrees announced by President W. O. Hotchkiss. Class day exercises were held on April 17. Cornelius F. Kelley, president of the Anaconda Copper Mining Company, delivered the class day address.

#### A. E. C. to Publish New Engineering Who's Who

The American Engineering Council announces the appointment of a committee to cooperate in the publication of a new edition of "Who's Who in Engineering." The function of the committee, according to Lawrence W. Wallace, executive secretary of the council, is "to provide such advice on the qualifications of engineers as will enable the publishers to issue a work which shall be authoritative."

### Record Established in Mining Machinery Exports

The greatest volume of mining and quarrying machinery in history was exported by the United States during the past year, according to the Industrial Machinery Division, Department of Commerce. The total value reached was \$17,953,877 as compared with \$14,059,592 in 1928.

Europe absorbed the largest portion of these shipments, with a total value of \$4,430,000, Soviet Russia in Europe, the United Kingdom, Spain and France being the principal customers in this area.

Excavators and power shovels, dredges, air compressors, although they are frequently employed in mining operations are not included in the above total.

South America purchased the next largest amount valued at \$3,843,000, closely followed by Canada, Newfoundland, etc., with purchases valued at \$3,834,000 and Mexico and Central America with \$1,975,000 (of which Mexico purchased all but \$118,000 worth), Africa \$1,803,000 and Asia \$1,374,000.

The Canadian market has been growing steadily over a considerable period and has held first place as an outlet for American mining and quarrying machinery ever since it assumed this position, in 1927, when Mexico dropped to second place. In 1929 Canada expended \$3,726,000 for these products, representing a gain of 36 percent over the purchases of the previous year. Some indication as to the ultimate destination of this increased volume may be gained from the fact that during the fiscal year 1928-29 Canadian exports of blister copper reached a value two and one-half times as large as in 1927-28, exports of nickel and its products, 40 percent larger, and gold-bearing quartz and bullion, 37 percent.

Exports of machinery for mining enterprises in Mexico showed a gain over 1928, despite several adverse factors, including political disturbance during the months of March and April, the introduction of a new law relative to labor and operators, and the low price of silver.

The Union of South Africa purchased a record volume of mining machinery in 1929, slightly exceeding the previous peak year, 1927. Considerable equipment entering into this trade was probably destined for transshipment to the new copper-mining development in Rhodesia, as well as for the increasingly active asbestos mines of the Union.

Exports to Soviet Russia in Europe were only slightly less than the record volume of 1928. This trade has in recent years been stimulated by Russia's ambitious industrial plans.

### Standard Smoke Ordinance

The Bureau of Mines has issued a tentative draft (Information Circular 6262) of a standard smoke-abatement ordinance prepared by a joint committee of representatives of the American Society of Heating and Ventilating Engineers, the Stoker Manufacturers' Association, the American Civic Association, and the Fuels Division of the American Society of Mechanical Engineers, presented for criticism and suggestions.

### Tax-Free Distributions Ruling—Basis for Gain or Loss

In a case involving the sale of certain certificates of beneficial interest in an incorporated association tax-free distributions made during 1923, 1924, 1925, out of earnings or profits accumulated prior to March 1, 1913, were used to reduce the basis for determining gain or loss derived from such sale. Upon protest by the taxpayer that such action of the Income Tax Unit was erroneous, the general counsel for the Bureau of Internal Revenue holds that the tax-free distributions out of earnings or profits accumulated prior to March 1, 1913, can be used to reduce the basis only to the extent that they were made on or before the effective date of the 1926 act. While this ruling can not affect similar claims arising under the 1928 act, it may be construed to apply to sales of stock or certificates made during the years 1924 to 1927.

### LEACHING AND CEMENTATION

(From page 531)

installed for loading direct from drying beds into railroad cars. The crane track was extended, giving more storage space for scrap iron.

The solution is pumped by Duriron pumps. The pipe line from No. 2 reservoir is 8-in. redwood stave, bound with chrome steel wire. Eight-inch wood lined wrought iron pipe serves to convey the water from the No. 1 reservoir and 8-in. redwood wound with pure copper wire is used from the No. 7 dump to the No. 2 pond.

The solution from the Nos. 1 and 2 reservoirs enter a meter box at the head of the plant where it is measured by a Bailey self-integrating V-notch meter, from there it is distributed by launder to the eight tanks, each tank getting an equal portion. The solution enters the side of the tanks and flows down through a well coming up under the false bottom, and discharging over a peripheral launder at the top. The overflow from the first two tanks goes to a sump tank which has been remodelled and is now being used as a precipitating tank, and from there to the old wood launders. Overflow from the remaining six tanks is collected in a main discharge launder and passes on to the concrete precipitation launders, entering the No. 1 and passing through the six in series. Tailings liquor from both the concrete and wood launders discharges into a settling

tank where any suspended copper which happens to be carried over is settled out, and from there passes on to the ponds where it is disposed of by evaporation and seepage into the ground. Solutions in the plant are kept in motion continually by air agitation. The air is introduced in the bottom of the tanks and launders through rubber hoses perforated for a uniform distribution. Air consumption is approximately  $\frac{1}{2}$  cu. ft. per cubic foot of precipitating space per minute. The air is not used to produce any chemical reaction, its principal function being to mechanically agitate the liquor and free the copper from the iron. Apparently this action has increased the plant capacity from 20 to 30 percent.

The original plant contained 17,115 cu. ft. of space, an additional 19,226 cu. ft. were added, bringing the total up to 37,141. The plant is now capable of producing one pound of copper per cubic foot of precipitating space per 24 hours.

Iron used for precipitation consists of baled tin cans which are received from Los Angeles, clippings from can factories and local scrap of all descriptions. Iron consumption ranges from 1.50 to 1.75 pounds per pound of copper. Unloading and handling of scrap is done with the crane and magnet.

The cement copper is removed from the tanks by shoveling into boxes which are hoisted out with the crane and dumped into railroad cars for shipment to the smelter. In cleaning cement launders, the copper and iron are taken out with clam shell buckets and dumped into a revolving trommel screen where the copper is separated from the iron and is sluiced down a launder to the drying beds, the scrap iron being returned to the plant for consumption. When sufficiently dry, the copper is loaded into cars with a drag line scraper for shipment to the smelter.

The average analysis of the cement copper is as follows:

Au.	Ag.	Cu.	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe.	CaO	S.	% H <sub>2</sub> O
Ni	Tr.	70.01	1.2	8.0	6.8	0.3	1.2	23.0

Copper production from this plant for the last 24 months was 24,037,368 pounds net. The average plant extraction is from 97 to 99 percent.

A total of 35 men are employed at the department. Labor segregation is as follows:

Heap leaching	6
Pump men	3
Plant operation	24
Mechanical labor	1
Tailing water disposal	1

The distribution of production costs is as follows:

	Percent
Supplies	55.40
Labor and salaries	15.84
Water	15.93
Electricity	3.12
Assaying	.35
General department expense	1.86
Depreciation	7.35
Miscellaneous	.35
	100.00

### Barite Report Issued by Bureau

The United States is now the leading source of supply and in the last few years has produced nearly one-half of the world's output of barite, according to the Bureau of Mines. Detailed information regarding the occurrence, use, mining, washing, milling methods, and production and consumption is given in the economic review just published by the Bureau (Information Circular 6221).

### Lake Cargo Coal Rate Controversy Reopened

The controversy between coal producers and shippers in the northern and southern fields over rate differentials on the vast tonnage which moves to lower Great Lakes ports for trans-shipment to the northwest is again in the limelight following the action of the Interstate Commerce Commission in refusing to dismiss the complaints of the Ohio Lake Cargo Coal Rate Committee and the Western Pennsylvania Coal Traffic Bureau, representing, respectively, operators in eastern Ohio fields and western Pennsylvania, as requested by southern carriers. The commission has announced that the complaints will be heard at Washington, D. C., June 16.

The northern districts are seeking an increase in the present 35-cent differential, which has been in effect since December 31, 1928, when the roads established it as a compromise.

### Madeira, Hill to Construct Modern Breaker Near Frackville, Pa.

Plans for the construction of a second central breaker have been completed by Madeira, Hill & Company, according to an announcement by E. H. Suender, general manager. The new plant will be built near Frackville, Pa., and will displace breakers now operated at the mouths of three mines. It is planned to have the new breaker ready for operation next fall. The company hopes eventually to replace a dozen small breakers with four large ones.

Madeira, Hill's Colonial plant, the first of its large central breakers, produced 728,000 tons of coal in 1929. This breaker is a consolidation of Greenough and Natalie collieries and is located at Mount Carmel.

### West Virginia Officials and Coal Operators Seeking Solution of Mine Drainage Problems

Steps toward a study of coal mine pollution problems were taken by the West Virginia Water Commission recently when it set June 16 as the date for a formal hearing on complaints against the proposed mine drainage system of the Pecks Run Coal Company in Upshur County. The commission is preparing a statement of principles in regard to mine drainage to submit to the West Virginia Coal Association, which in turn will name a committee to work with the commission. Six representatives of the association, headed by Brooks Fleming, of Fairmont, appeared before the commission and expressed their willingness to cooperate in working out mine pollution questions.

Among methods of procedure that have

been suggested are a general survey of the quantity and types of mine drainage in various sections of the state, and demonstration methods showing the practicability of sealing off acid water in abandoned mines.

Operators who appeared before the Water Commission were: Brooks Fleming, Consolidation Coal Company, Fairmont; A. W. Louthier, Bethlehem Mines Corporation, Reedsville; C. E. Watts, Bethlehem Mines Corporation, Johnstown, Pa.; F. C. Baker, West Virginia Coal & Coke Corporation, Elkins; H. A. McAllister, Hutchinson Coal Company, Logan; C. A. Cabell, Carbon Fuel Company, Charleston; Jesse Sullivan, acting secretary of the West Virginia Coal Association.

### Locust Summit Breaker In Full Operation

The western half of new central breaker of Philadelphia & Reading Coal & Iron Company, at Locust Summit, Pa., went into operation the latter part of May. The eastern half of the plant has been in operation for over a month, and was just recently placed on double shift, preparing 6,000 tons of anthracite daily. Production is expected to reach 12,000 tons per day with the plant in full operation, with an ultimate capacity of 16,000 tons.

Excavation and grading for the company's second central breaker, to be located at St. Nicholas, Pa., have been started. Like the Locust Summit breaker, the St. Nicholas plant will cost approximately \$4,000,000.

### M. A. Hanna Forms New Coal Mining Subsidiary

The M. A. Hanna Coal Company has been incorporated under the laws of the State of Delaware to take over the bituminous coal-mining operations conducted by the M. A. Hanna Company, of Cleveland. The subsidiary companies of the Hanna Company are the Wheeling & Lake Erie Coal Mining Company, Massillon Coal Mining Company and Jefferson Coal Company. Officers of the new company are: William Collins, president; R. L. Ireland, Jr., vice president; P. C. Sprague, vice president; W. C. Scott, secretary; and C. W. Brown, treasurer. The operating personnel remains unchanged.

In addition to conducting a general business by both rail and lake, the Hanna Coal Company has an exclusive agency for mines which it operates and has affiliated with it dock facilities on both the upper and lower lakes.

### American Rolling Mill Company Forms Mining Subsidiary

The West Virginia coal mining properties of the American Rolling Mill Company are to be taken over and operated by the Armco Coal Mining Corporation which has been organized under the laws of Delaware. The properties include the mine at Nellis, Boone County. The officers of the operating company are practically the same as those of the parent company and include C. B. Hood, president; Calvin Veritym, vice president and treasurer and general manager; C. W. Davis, assistant treasurer; W. D. Vorhis, secretary; and M. E. Thompson, assistant secretary. The principal offices of the company are at Middletown, Ohio.

### Hart Leaves West Virginia Coal Association

James B. Hart resigned as assistant secretary of the West Virginia Coal Association to become secretary to J. D. Francis, vice president of the Island Creek Coal Company. Mr. Hart has been acting secretary of the association pending selection of a successor to Walter H. Cunningham, who resigned recently as secretary. Jesse V. Sullivan, of Charleston, will succeed Mr. Hart.

Headquarters offices of the association, which were for many years in Huntington, have been moved to the Kanawha Valley Bank Building, in Charleston.

### Coal Research Laboratory at Carnegie

Gifts totaling \$425,000 to extend over a five-year period for the establishment and maintenance of a coal research laboratory at the Carnegie Institute of Technology were announced recently by Dr. Thomas S. Baker, president of the Institution.

The Buhl Foundation, of Pittsburgh, is the largest single donor to the project; other contributors are the United States Steel Corporation, the General Electric Company, the Koppers Company, the New York Edison Company, the Standard Oil Company of New Jersey, and the Westinghouse Electric and Manufacturing Company. These six corporations will contribute a total of \$50,000 a year for five years for the maintenance of the laboratory.

The plan for the new laboratory will go into effect July 1, 1930. Several prominent scientists are being considered as members of the staff, and it is expected that a director for the laboratory will be announced soon.

The laboratory, according to Dr. Baker, will be a part of the Carnegie Institute of Technology, and will undertake funda-



mental research in coal and the products which may be obtained from it. The Carnegie Institute of Technology will organize graduate courses for the training of students in fuel technology in connection with the research laboratory, with the research staff giving instruction.

"There is no laboratory at present in the United States that is doing the work that we have outlined. There are many uses and by-products of coal still to be developed. Finally, there is the question of the smokeless city which can never be answered until a serviceable smokeless fuel has been discovered," said Dr. Baker.

### Coal-Mine Fatalities in April

Accidents in the coal-mining industry of the United States in April resulted in the death of 159 men. One hundred and twenty-eight of these fatalities occurred in bituminous mines in various states and the remaining 31 were in the anthracite mines of Pennsylvania. These figures are based upon reports received from state mine inspectors by the Bureau of Mines. The death rate per million tons of coal produced during the month was 3.90 for the entire industry, based on an output of 40,776,000 tons of coal. Separated into bituminous and anthracite, the death rates were 3.57 and 6.31 respectively. These rates were based on 128 deaths and 35,860,000 tons for bituminous mines and 31 deaths and 4,916,000 tons for anthracite mines. The record for April was somewhat better than that for the preceding month of March, but it was not as good as the record for April a year ago. The fatality rate for bituminous mines for March, 1930, was 3.86, based on 138 deaths and 35,773,000 tons; that for anthracite mines was 6.59, based on 30 fatalities and 4,551,000 tons. April of 1929 had a record of 110 deaths at bituminous mines and an output of 37,380,000 tons, with a fatality rate of 2.94; anthracite mines reported 37 deaths, 6,441,000 tons and a rate of 5.74; the combined rate for both classes of mines being 3.35 per million tons of coal produced.

Reports made to the Bureau of Mines for the first four months of 1930 show that 714 men have lost their lives in coal-mine accidents in the United States. As the production of coal during this period was 183,628,000 tons, the death rate was 3.89. The rate for bituminous mines for this period was 3.50, based on 563 deaths and 160,966,000 tons of coal; that for anthracite was 6.66, based on 151 deaths and 22,662,000 tons. For the same period in 1929 the rate for bituminous mines alone was 3.09, with a production of 177,290,000 tons and 547 fatalities. The rate for anthracite was 5.96, with a production of 25,492,000 tons

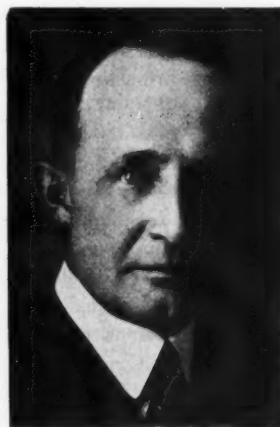
and 152 deaths, while the death rate for the industry as a whole was 3.45, based on 202,782,000 tons and 699 deaths.

One major disaster—that is, a disaster in which five or more lives were lost—occurred during the month of April, 1930. This was an explosion at Carbonado, Wash., on April 12, which caused the death of 17 men. April, 1929, was free from such disasters. During the first four months of 1930, 7 major disasters with a total of 88 deaths were reported, as compared with two disasters and 60 deaths during the corresponding period of 1929. Based exclusively on these disasters the death rate per million tons of coal produced during the four-month period of 1930 was 0.479, as compared with 0.296 for the same period last year.

Comparing the accident record for the first four months of 1930 with that for the same period in 1929, a reduction is noted in the fatality rate for haulage, but increased rates are shown for the other principal causes of accidents, the notable increase in the rate for gas or dust explosions being due to the large number of major disasters in 1930.

### Brennan Heads Utah Operators Association

W. D. Brennan, president and general manager of the Utah Fuel Company for the past few months, has been elected president of the Utah Coal Producers' Association, succeeding S. F. Ballif, Jr., formerly head of the Royal Coal Company, and now in the brokerage business



W. D. Brennan

in Salt Lake. Mr. Brennan was formerly general manager of the Stag Canon Branch of the Phelps Dodge Corporation at Dawson, N. Mex.

L. R. Weber, vice president of the Liberty Fuel Company, was elected vice president of the association, and Oliver J. Grimes was reelected executive secretary and treasurer. The annual meeting of the association was held the middle of April in Salt Lake.

### Campbell Made Vice President of Old Ben

At the annual meeting of the board of directors of the Old Ben Coal Corporation early in May, George F. Campbell, general manager, was elected to the office of vice president, and Frank N. Browning was appointed sales manager to succeed J. W. Collier, resigned. Mr. Campbell became connected with the Old Ben Corporation in 1912, and in 1923 was appointed general outside superintendent. In 1928 he became assistant to the president and last year was appointed general manager of the corporation.

### Anthracite Association Petition Urges Immediate Ban of Soviet Coal Imports

The Anthracite Cooperative Association, through Roy C. Haines, executive vice president and secretary, presented a formal petition the latter part of April to Secretaries Mellon of the Treasury, Davis of Labor, and Lamont of the Commerce Department in support of an oral plea, made previously by a large delegation representing the anthracite industry, for immediate steps to bar by Presidential proclamation imports of coal from Soviet Russia. The ban would be effected through that section of the tariff law designed to protect American labor and industry and to offset industrial disadvantages, discriminatory measures, unfair methods and practices of competition in import trade.

"Based upon these provisions," says the brief, "the Anthracite Cooperative Association, a corporated body under the laws of the Commonwealth of Pennsylvania, and composed of the anthracite operators, the United Mine Workers of America, and the public, through its proper executive, petitions the Secretary of the Treasury, Secretary of Labor and the Secretary of Commerce, to immediately set in operation the necessary steps for the exclusion, under said provision, of Russian anthracite coal mined, processed and transported, directly or indirectly by the Soviet Government.

"Under the constituted authority of Soviet Russia, it is common knowledge that this government has entered the industrial field under a highly extensive program, known as the 'five-year industrial program.' It is equally well known that one of the products best suited for immediate financial returns to the Soviet Government is the production and exportation of anthracite.

"It is also known that the said Soviet Government controls the price of labor, the hours of work, living conditions of the miners, prescribes discipline of all workers, fixes the yearly quota of pro-

duction, and subsidized the transportation of this commodity to foreign market.

"It is clearly the intention of the tariff act to protect American workmen and American industry, yet the conception and execution of the Soviet governmental plan creates an entirely new condition whereby the labor of the miners is organized either to produce a profit to the state or an advantage to the state in regard to labor costs, which, when compared with American wages and expression of living, presents a condition impossible for American operators to compete with; also does the Soviet Government so manipulate its incoming and outgoing ocean freights as to heavily subsidize the rates on export coal to such a degree as to preclude successful competition by American rail freight carriers, even though Russian anthracite travels, as in the case of Boston, Mass., about 18 miles for every mile of Pennsylvania anthracite.

"The Soviet Government realizes that only through subsidization of its labor and its transportation can it successfully place its coal upon the coal markets of the world." \* \* \*

"It is clearly the intent of the present and all tariff acts to impose duty of exclusion on all competitive products produced at home in quantities sufficient to care for home consumption.

"Pennsylvania is capable of supplying the American anthracite market and export several million tons yearly to Canada—a natural and necessary Pennsylvania anthracite market. The incoming of Russian anthracite and the sale of it in American markets will seriously interfere with Pennsylvania anthracite production, the earning capacity of the miner, and the welfare and prosperity of the 2,000,000 people of the anthracite region." \* \* \*

"It is current knowledge among the anthracite industry and trade that agents of the Soviet Government are making contracts with American and Canadian distributors whereby the Soviet Government agrees to absorb all tariff duties which may be put into effect and at the same time agrees that the price of Russian anthracite be made dependent upon the price of American anthracite by the guarantee that Russian anthracite will be sold to distributors at a price in direct competition with Pennsylvania anthracite." \* \* \*

"The development of imports in Canada and the United States show how rapidly Soviet Russia is putting its industrial program into operation. In 1928, the first year of anthracite production in the Donetz Basin, the Soviet Government sent to Canada 6,204 tons. The next year Canada accepted 117,404 tons.

In the United States during 1929, there were imported 113,170 tons. In January of this year, imports amounted to practically 11,000 tons and in February to 46,000 tons. It is interesting to know that in this connection, the freight rate from Port Mariupol to Boston has this year been reduced from \$3.88 to \$3.52 per ton. The distance is about 7,000 miles. The railroad freight rate on Pennsylvania anthracite to Boston is \$4.38, the maximum haul being about 400 miles.

"When the five-year program period is completed three years hence, the Soviet Anthracite Trust believes it will be prepared to ship to American market 10,000,000 tons of anthracite."

### Calcium Chloride to Reduce Explosions

Experiments for the elimination of coal dust explosions through the use of calcium chloride will be conducted in various mines throughout the country as soon as cooperating mine owners can be found, according to Miller D. Hay, chief mine inspector of the State of Oklahoma.

"The theory upon which the solution will be placed in the mine," declared Mr. Hay, "is that it will eliminate the danger of explosions by pulling from the air particles of coal dust and holding them on the floor of the mine. The solution could be placed in the mine at the end of the week, drawing from the air sufficient coal dust to eliminate explosions, but not too much moisture to make the mine unhealthy." The calcium chloride process would entail a greater initial cost; according to Mr. Hay, but it is believed that experimentation will show that less frequent applications will be necessary.

### Commercial Stocks of Anthracite and Bituminous Coal

Consumers' stocks of bituminous coal declined steadily during the first quarter of 1930, and on April 1 amounted to 33,100,000 tons, according to the U. S. Bureau of Mines. On January 1, the date of the last survey, there was 40,300,000 tons in storage. During the month of January there was a net decrease of 2,600,000 tons, leaving a balance of 37,700,000 tons on hand. On February 1. From February 1 to April 1 there was a further reduction of 4,600,000 tons. Thus the total withdrawn from storage between January 1 and April 1 was 7,200,000 tons.

The reduction in stocks took place in spite of the fact that a slowing down of general business curtailed the demand for coal. All major classes of consumers in practically all regions of the country were consuming less coal than in the

corresponding months of the year before. The average weekly rate of consumption during the first quarter of the year was 10,432,000 tons. Exports averaged 219,000 tons and total consumption plus exports was 10,651,000 tons a week. In comparison with the same period of last year, the rate of home consumption plus exports shows a decrease of 883,000 tons, a decline of 7.7 percent.

Although stocks on April 1 were lower than on comparable dates in other recent years, it should be remembered that with the close of the heating season the rate of consumption declines abruptly. Last year, for example, the rate of consumption during the second quarter was 22 percent less than during the first quarter.

### BITUMINOUS STOCKS BY CLASSES OF CONSUMERS

At the rate of consumption prevailing in February and March, the stocks on April 1 were sufficient to last 23 days if evenly divided. Stocks are rarely evenly distributed, however, and there were wide variations in the reserves of individual consumers. The largest reserves on April 1 were held by the coal gas plants, which reported an average of 58 days. The electric utilities, coal dealers, and railroads report lower stocks on April 1, 1930, than on the same date last year; the by-product coke plants and coal-gas works show a slight gain; while the reserves at steel plants and other industrial remain practically the same as on April 1, 1929.

*By-product coke and steel works.*—Stocks at both by-product coke plants and steel works have decreased during the last three months. Complete returns from the by-product plants indicate a total of 4,614,110 tons of coking coal in storage on April 1, of which 3,478,364 tons was high volatile and 1,135,746 tons was low volatile. The steel works and rolling mills reported 754,834 tons of steam coal and 540,496 tons of gas, a total of 1,295,330 tons.

*Railroad fuel.*—Stocks of railroad coal have also declined sharply during the past three months. According to the American Railway Association, the total reserves held by the railroads on April 1 amounted to 6,355,000 tons. In comparison with the quantity on hand at the first of the year, this is a decrease of 1,087,000 tons, and is also less than the tonnage in storage on the corresponding dates of other recent years.

### AVERAGE WEEKLY RATE OF BITUMINOUS CONSUMPTION

As the stocks needed by consumers depend on the amount they are burning, it is important to note the trend of consumption, which fluctuates widely with the conditions of general business and with the season.

*Consumption in the first quarter of 1930.*—From January 1 to March 31 the average rate of consumption in the United States, including net withdrawals from stock piles or reserves in transit, was 10,432,000 tons a week. The exports averaged 219,000 tons a week, and the total consumption plus exports was 10,651,000 tons. Exports were somewhat below normal, being less than at any corresponding season on record except 1928 and 1922.

*Decrease as compared with the preceding period.*—The home consumption for the first quarter of 1930—10,432,000 tons a week—shows a decrease of 350,000 tons when compared with the last two months of 1929. This decline reflects the recession in general business which began in the closing months of 1929 and continued throughout the early months of the current year.

*Decline in comparison with 1929.*—In comparison with the same period of last year, the consumption during the first quarter shows a decrease of 9.6 percent and, in fact, was less than in the corresponding season of other recent years.

#### ANTHRACITE

*Coal in retail yards.*—Stocks of both anthracite and bituminous coal in the hands of retail coal dealers on April 1 show the usual seasonal decline. Since the first of the year anthracite stocks have been reduced by 29 percent, but they are nearly 5 percent greater than the amount held by the same dealers on the corresponding date a year ago. At the rate the householders were calling for anthracite in February and March, the stocks on April 1 were sufficient to last 31 days.

It was not feasible to canvass all retailers, but information was obtained from a representative group of 856 dealers scattered throughout the country who are believed to be typical. Of these dealers there were 465 handling anthracite and 780 handling bituminous coal, who have reported at every one of the stock surveys since 1919.

Retail stocks of bituminous coal have also declined during the last quarter. In comparison with the quantity of bituminous coal in retail yards three months ago, the tonnage on hand April 1 shows a decrease of nearly 34 percent. The present stocks of bituminous coal are also 8.6 percent less than the amount in storage on the same date last year and are likewise less than on corresponding dates of other recent years. At the rate of delivery in February and March, the stocks on hand April 1 were sufficient to last 16 days.

#### COAL ON THE UPPER LAKE DOCKS

On April 1, there were 3,976,910 tons of bituminous coal on the Upper Lake

Docks, of which 2,954,755 tons were on Lake Superior and 1,022,155 tons on Lake Michigan. The present stocks are slightly higher than on the same date last year, but are less than on April 1, 1928.

Stocks of anthracite on the Upper Lake Docks were considerably less than those at the corresponding periods in other recent years. Reports to the Bureau of Mines from the dock operators show that on April 1 there were 243,270 tons on Lake Superior and 165,436 tons on Lake Michigan, a total of 408,706 tons.

#### Index to Coal Reports

For the convenience of the coal trade, the Bureau of Mines has published an index to the weekly reports on the production and distribution of coal and coke and to the monthly reports on production of by-product and beehive coke issued during the coal year 1929-30. The economic information regarding the coal and coke industries contained in these weekly and monthly reports is thus made much more readily available. The references cited include such items as relative growth of coal, oil and water power; world energy supplies; labor statistics; methods of mining; current trends of coal consumption; coal production by states; distribution of anthracite and bituminous coal; consumers' stocks of coal; by-products recovered at coke ovens, etc.

#### Winners Announced in National Safety Competition

Outstanding safety accomplishments of a number of large mines and quarries have just been recognized in the awarding of the "Sentinels of Safety" trophy to the winners of the National Safety Competition held during 1929 under the auspices of the United States Bureau of Mines.

First place in the anthracite mining group was awarded to the Highland No. 6 mine of the Jeddo-Highland Coal Co. at Jeddo, Pa. This mine worked 142,128 man-hours in 1929 with but 8 lost-time accidents, causing 64 days of disability.

In the bituminous coal-mining group first place was awarded to the Hull No. 33 mine, operated by the DeBardeleben Coal Corporation at Dora, Ala. At this mine 264,656 man-hours were worked in 1929 with but 3 lost-time accidents, which occasioned 21 days of disability.

First place in the metal-mine group was given the Berkshire iron mine of the Brule Mining Co., Stambaugh, Mich. This mine, which also won first place in this group in the 1928 contest, worked

345,695 man-hours with no lost-time accidents.

In the metal-mine group, honorable mention was given the Homer iron ore mine of the Buffalo Iron Mining Co., Iron River, Mich.; the Wilbur zinc and lead mine of the Commerce Mining and Royalty Co., Cherokee County, Kans.; the Jay Bird zinc and lead mine of the Commerce Mining and Royalty Co., Miami, Okla.; and the Webber zinc and lead mine of the Commerce Mining and Royalty Co., Cherokee County, Kans. The first three named went through the year 1929 without incurring a single lost-time accident.

Honorable mention in the anthracite mining group of contestants was given to the Jeddo No. 7 mine of the Jeddo-Highland Coal Co. at Jeddo, Pa.; the Kehley's Run mine of the Thomas Colliery Co., Shenandoah, Pa.; the Raven Run mine of the Hazle Brook Coal Co., Raven Run, Pa.; and the Beaver Meadow mine of the Coxe Brothers and Co., Inc., Beaver Meadow, Pa.

Honorable mention in the bituminous group was given the Corona No. 16 mine of the DeBardeleben Coal Corp. at Coal Valley, Ala.; the Corona No. 12 mine of the DeBardeleben Coal Corp. at Corona, Ala.; the Dawson No. 5 mine of the Phelps Dodge Corporation at Dawson, N. Mex.; and the Stewart mine of the W. J. Rainey, Inc., Southwest, Pa.

Approximately 300 coal and metal mines, nonmetallic mining operations and quarries, located in 33 states, participated in the contest. Two large iron mines in Michigan, a Kansas zinc and lead mine, an Oklahoma zinc and lead mine, a salt mine in New York, an Ohio limestone mine, and 46 quarries and open-cut mines in Michigan, Oklahoma, Ohio, Missouri, Pennsylvania, Illinois, Virginia, Iowa, California, Indiana, New York, Texas, New Jersey, Maryland, Kansas, and Alabama were operated throughout the year without a single accident involving loss of working time by an employee. The total amount of exposure to hazard was more than 106,000,000 man-hours.

The 1929 contest was the fifth held. Competing companies were grouped into five classes; namely, anthracite mines, bituminous coal mines, metal mines, non-metallic mineral mines, and quarry and open-cut mines. The winner in each group was the mine or quarry whose record showed the smallest loss of time from accidents in proportion to the total amount of time worked by all employees. The competition for the trophy was restricted to mines employing at least 50 men underground and to quarries and open-cut mines employing at least 25 men in the pit. The bronze trophy, "Sentinels of Safety," the work of a well-known artist, is awarded to the winning company in every group by the Explosives Engineer magazine.



## COPPER PRODUCTION IN 1929

Production and consumption of copper which assumed record-breaking proportions in the fall of 1928, continued at a high rate through 1929, according to the Bureau of Mines, and for the year were the highest on record. Heavy demand preceded the large increase in production and was met, in part, by stocks of refined

copper, which at the end of 1928 had dwindled to the lowest on record since 1917. In 1929 production was at a sufficiently higher rate than consumption to cause stocks of refined copper to increase to more than two and one-half times those at the end of 1928 and to the highest on record since the end of 1921. The increase in imports of unmanufactured copper to a record figure and a drop in exports of 7 percent from the average of the five-year period 1924-1928 added to the large increase in stocks. At the end of the first quarter of 1929, stocks of refined copper having increased, consumers resumed a hand-to-mouth buying policy which had been abandoned in the fall of 1928.

The final figures on total United States copper production by primary refineries, from primary and secondary sources, show that the Bureau's preliminary estimate, issued earlier this year, was high by 0.2 percent. Wider differences between final and preliminary figures on production from domestic and foreign materials of both primary and secondary origin is explainable by the fact that the final reports from refiners make possible a more exact apportionment of the production in accordance with its domestic or foreign, primary or secondary origin. This final report also shows that the preliminary estimates of producers' stocks were too low by 15 percent.

## COPPER PRODUCED IN THE UNITED STATES FROM DOMESTIC ORES, 1928-1929 (Smelter output, in pounds fine)

State	1928	1929
Alaska	40,541,968	39,867,940
Arizona	735,632,406	829,206,475
California	24,707,992	33,084,232
Colorado	10,262,083	10,519,784
Idaho	2,336,654	6,267,487
Michigan	179,104,311	185,300,917
Missouri	990	1,880
Montana	251,046,415	299,894,852
Nevada	159,332,977	138,990,247
New Mexico	92,777,233	100,165,206
North Carolina	8,207,000	*
Oregon	375,049	739,151
Pennsylvania	5,013,868	3,581,393
Tennessee	16,374,261	*
Texas	432,968	393,740
Utah	298,375,465	325,965,282
Vermont	1,187,346	752,206
Washington	1,569,261	1,569,261
Wyoming	2,575	4,305
Undistributed	178,898	26,558,776
	1,825,900,393	2,002,863,135

\* Included under undistributed. Bureau not at liberty to publish.

## SUMMARY OF FEATURES OF THE COPPER INDUSTRY IN THE UNITED STATES, 1928, 1929

	1928	1929
Production of copper:		
Smelter output.....pounds..	1,825,900,393	2,002,863,135
Mine production.....do.....	1,809,796,907	*
Refinery production of new copper:		
Electrolytic.....do.....	1,607,120,026	1,785,754,654
Lake.....do.....	179,104,311	185,300,917
Casting.....do.....	5,573,050	11,676,718
Total domestic.....do.....	1,791,797,387	1,982,732,289
Total domestic and foreign.....do.....	2,487,607,779	2,740,112,376
Total new and old copper.....do.....	3,560,000,000	*
Ore produced:		
Copper ore.....short tons..	62,097,132	*
Average yield of copper.....percent..	1.41	*
Copper-lead and copper-zinc ores.....short tons..	351,131	*
Average price per pound.....cents..	14.4	17.6
Imports (unmanufactured).....pounds..	787,073,640	974,312,201
Exports of metallic copper.....do.....	1,121,186,640	992,895,119
Withdrawn from total supply on domestic account:		
Total new copper.....pounds..	1,608,538,878	1,778,585,415
Total new and old copper.....do.....	2,681,000,000	*
Stocks of refined copper.....do.....	114,000,000	306,000,000
Stocks of blister and materials in solution.....do.....	423,000,000	500,000,000
Value of smelter production from domestic ores.....dollars..	262,930,000	352,504,000

\* Figures not yet available.

† Total exports of copper, exclusive of ore, concentrates, composition metal, and unrefined material.

‡ At the end of the year.

## THE BAUXITE INDUSTRY IN 1929

Shipments of bauxite from mines in the United States in 1929 were 365,777 long tons, valued at \$2,265,638, a decrease of 2.6 percent in quantity and of 0.4 percent in total value, as compared with 1928, according to the Bureau of Mines.

In Alabama bauxite was produced in 1929 from the Eufaula and "Lennig" mines, in Barbour County, and the Davis Hill No. 3 mine, in Henry County. The shipments were 70 percent more than in 1928, of which about half was shipped for use in the abrasive industry and about half for use in the chemical industry.

Bauxite was produced in Georgia in 1929 at the Dupont mine in Floyd County, and the Lane McMichael mine in Macon County. Shipments from Georgia in 1929 were 53 percent less than in 1928. All of which was shipped for use in the chemical industry.

In 1929 bauxite was produced in Arkansas at five mines: The Sweet Home, Dixie No. 2, and Hoekstra mines, in Pulaski County, and the Bauxite and Superior mines, in Saline County. Shipments of bauxite from Arkansas in 1929 were 351,054 long tons, a decrease of 3 percent from 1928. The main production originated in the Saline County field, in which there was a decrease of 5 percent, but the mines in Pulaski County shipped important quantities, the increase over 1928 being 8 percent. The shipments from Arkansas were mainly for use in the aluminum industry, followed in order by the abrasives, chemical, and refractories industries.

The producers of domestic bauxite reported sales during 1929 at prices ranging from \$5 to \$8.50 a long ton. The average for Arkansas bauxite was \$6.21 a ton; for Alabama, \$5.95; and for the United States, \$6.19. Probably the values

reported to the Bureau of Mines by most operators represented nearly production costs, as the greater part of the domestic bauxite is produced by consumers of bauxite. The quoted prices for bauxite were as follows: Domestic—No. 1 chemical ore, crushed and dried, 55 to 58 percent  $\text{Al}_2\text{O}_3$ , and 1.5 to 2.5 percent  $\text{Fe}_2\text{O}_3$ , \$7.50 to \$8.25 a long ton f. o. b. Alabama and Arkansas mines; foreign—Dalmatian bauxite, 50 to 55 percent  $\text{Al}_2\text{O}_3$ , and 1 to 3 percent  $\text{SiO}_2$ , \$4.80 to \$6.50; Istrian, 54 to 57 percent  $\text{Al}_2\text{O}_3$ , and 3 to 5 percent  $\text{SiO}_2$ , \$5.50 to \$7; and French, 56 to 59 percent  $\text{Al}_2\text{O}_3$ , and 2 to 5 percent  $\text{SiO}_2$ , \$6 to \$8 a metric ton c. i. f. New York.

## REFINED PRIMARY LEAD IN THE UNITED STATES IN 1929

The output of refined primary lead in the United States, from domestic ore, amounted in 1929 to 672,498 short tons, valued at \$84,735,000, as shown by reports made by producers to the Bureau of Mines. The production was 7 percent larger than in 1928 and the value was nearly 17 percent larger. The greater percentage of increase in the value of lead produced was due to the increase in the average selling value of lead from 5.8 cents a pound in 1928 to 6.3 cents in 1929. The production of refined lead from foreign ore, principally from Mexico, amounted to 102,135 short tons; a decrease of 34 percent from the production in 1928. Consequently, there was a decrease in the total output of primary lead from domestic and foreign sources of nearly 1 percent.

Nearly 31 percent of the lead produced from domestic ore was derived from Missouri; nearly 23 percent was derived from Utah; and nearly 22 percent from Idaho. The amounts produced by these states in 1928 represented 30 percent, 24 percent, and 22 percent of the total, respectively; almost the same as in 1929. The remainder was derived from a number of states, the most important in 1929 being Oklahoma, Kansas, Montana, and Colorado.

The apparent consumption of refined primary lead in the United States in 1929 amounted to about 693,000 short tons, as compared with about 658,000 tons in 1928.

## MOLYBDENUM PRODUCTION INCREASED AGAIN IN 1929

Four companies produced molybdenum ore in the United States during 1929, the Climax Molybdenum Co., at Climax, Colo.; the Molybdenum Corporation of America, at Sulphur Gulch, near Questa, N. Mex.; the Southern Copper Mining Co., at Helvetia, Ariz.; and the Minerals & Metals Corp., near Sahuarita, Ariz., according to data collected by the United States Bureau of Mines.

In 1929 a total of 419,400 short tons of ore was milled, yielding 3,854 tons of concentrates, carrying from 75.40 to 88.33 percent molybdenum sulphide. In addition a small tonnage of ore carrying 16 percent of molybdenum sulphide was produced and sold without milling. The metallic molybdenum content of the concentrates and ore so produced was 4,020,607 pounds, an increase of 17 percent over 1928. The shipments of concentrates and ore from the mines contained an equivalent of 3,904,648 pounds of elemental molybdenum, valued, more or less arbitrarily, at \$2,259,000 at the mines.

## WITH THE MANUFACTURERS

### Westinghouse Appoints Scientific Advisory Board

S. M. Kintner, assistant vice president in charge of engineering of the Westinghouse Electric and Manufacturing Company, announces the appointment of a scientific advisory board, which will act in a consulting capacity to the personnel of the Westinghouse research laboratories. This is a part of the research expansion program as typified in the enlarged laboratories which by fall will provide two and one-half times the present space facilities. The advisory board consists of the following scientists:

Dr. O. E. Mendenhall, head of the department of physics at the University of Wisconsin; Dr. P. W. Bridgman, professor of physics at Harvard University; Dr. Stephen Timoshenko, head of the School of Advanced Mechanics at the University of Michigan; Dr. G. B. Waterhouse, head of the department of metallurgy at the Massachusetts Institute of Technology; Dr. Edward Mack, Jr., head of the department of physical chemistry at Ohio State University.

It is planned to have the advisory board meet as a group with the section leaders at the research laboratories approximately three times a year. As individuals, they will come to the laboratories at more frequent intervals for the purpose of consultation on specific problems.

It is expected that this group will be of very material assistance in keeping the Westinghouse research laboratories informed of the latest scientific advances which may be of interest to the industry. A closer cooperation between pure and applied science is quite essential, and this new arrangement should provide an important link.

### Bullard-Davis Now E. D. Bullard Co.

Bullard-Davis, Inc. (of California), have changed their name to E. D. Bullard Company. Just recently the company purchased the First Aid Equipment and Supply Company of Los Angeles, who have been engaged in the manufacture and sale of a wide variety of first-aid material and equipment for many years.

"It has for many years been the aim of our company," said E. W. Bullard, president of E. D. Bullard Company, "to develop to such a point that we might manufacture and distribute the most

complete and well-rounded line of safety equipment west of the Mississippi. We believe that with the purchase of the First Aid Equipment and Supply Company we are in a fair position to claim our goal."

The company's five offices, located in San Francisco, Los Angeles, Seattle, Salt Lake City, and Houston, provide 24-hour service to mines and industries located west of the Mississippi River.

### Link-Belt Organization Expansion Increases Scope of Service

Link-Belt Company, crane and shovel division, 300 West Pershing Road, Chicago, announce the substantial enlargement of their sales organization, so as to be better able to cope with the increasing demand for shovels, cranes, draglines.

This includes the recent appointment of the following experienced companies as their direct representatives for the sale of these machines:

W-D-M Equipment Company, Columbia, S. C.; Myer & Cunningham, New York City; Barzee Equipment Company, Syracuse, N. Y.; S. G. Hawkins Company, Houston, Tex.; Lewis-Patten Company, San Antonio, Tex.; West Virginia-Kentucky Hardware & Supply Company, Huntington, W. Va.

### New Self-Propelling Coal Drill

The new type CD-4 coal drill, now being placed on the market by the Sullivan Machinery Company, represents a development of particular interest in extending the mechanization idea. This

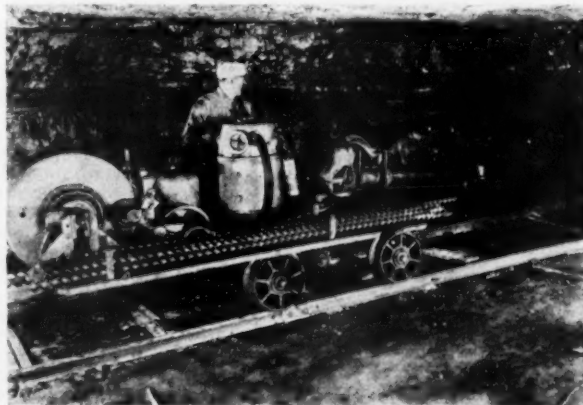
machine, which is shown in its moving position in the illustration, is a self-contained, electric driven drill for putting in shot holes in the coal face. It is mounted, as will be noted, on a self-propelling truck, equipped with a self-winding cable reel, and carrying its motor, which operates the drill and the truck as well. The rapidity with which this outfit drills the face and moves from place to place enables it to drill a large number of rooms much more rapidly than a drilling crew equipped with any kind of air or electric auger which has to be set up at the face each time.

The drill is of 8.5 hp., and permissible or Government approved explosion-proof motor and control casings can be supplied if desired. The drilling arm or boom is 11½ ft. long; and feed screws 5 and 9 ft. long are available. The drill is fully swiveled, as well as the arm, so that it can put in holes in any desired direction, and at any desired point in the coal face.

The "CD-4" boom is universally jointed with swinging range sufficient to put in holes in side walls at right angles to the track.

The rate of drilling speed or advance is 5 ft. per minute, and the drill will put in a 2½-in. hole readily to a depth of 9 ft. It has automatic feed control and three feeds, two forward and one back. The "CD-4" carries its own cable on a self-winding reel, and has all moving parts (except chuck and spindle) fully enclosed, running in oil or grease.

All operations of the drill and arm are taken care of by the power of the outfit. The rig propels itself along level track at approximately 600 ft. maximum speed per minute.



*The Sullivan CD-4 Track Drill putting in a bottom hole*

### Hercules Powder Company Issue Illustrated Booklet Describing Chemical Products

A four-color photomicrograph of abietic acid crystals grown in rosin is a feature of a 51-page booklet just issued, describing the chemical products of the Hercules Powder Company.

According to the booklet, abietic acid is a cheap organic acid which research indicates will develop wide commercial use. It is one of a number of terpene chemicals and organic compounds discussed.

The properties and specifications of Hercules naval stores, nitrocellulose, cotton linters, and acids are described in the booklet; and included are historical details and notes on processes employed by Hercules and the industry in general.

The booklet is well illustrated with plant and laboratory scenes. It may be had by writing to the Hercules Powder Company, Wilmington, Del.

### "The Centrifugal Pump"

Goulds Pumps, Inc., of Seneca Falls, N. Y., have published a new handbook on "The Centrifugal Pump," covering every phase of the centrifugal pump from theory to installation and operation. It was compiled for Goulds by F. G. Switzer, professor of hydraulic engineering, Cornell University, and is a practical handbook of data—valuable to technical student, instructor, engineer, and pump operator alike.

One of the most interesting chapters in the book is that on testing, where the reader is taken through a modern testing laboratory and shown, step by step, how centrifugal pumps are inspected and put in perfect operating condition before they leave the factory.

### Linde Engineer Elected President of Welding Society

E. A. Doyle, consulting engineer of the Linde Air Products Company, was elected president of the American Welding Society at the annual meeting of the society held April 25, 1930.

The American Manganese Steel Company announces the election of A. W. Daniels as vice president in charge of sales. Mr. Daniels is an authority on the markets and marketing of manganese steel and is in complete touch with the developments of the industrial world as applied to the products of the American Manganese Steel Company, and because of his close, personal contact with the leaders of industry, and his keen analysis of business conditions, he is well fitted by experience and knowledge to fill this new position.

### R. W. Gillispie, New President of The Jeffrey Manufacturing Co.

The directors of the Jeffrey Manufacturing Company, at the annual meeting held April 23 at Columbus, Ohio, elected



R. W. Gillispie

Robert W. Gillispie president and general manager of the company. He was

formerly vice president and general manager. At the same time the board elected Robert H. Jeffrey, former president of the company, to the position of chairman of the board.

In electing Mr. Jeffrey to the chairmanship the board of directors recreated a position which has been vacant for two years. In addition to being president of the Jeffrey Company, Mr. Gillispie is also president of two subsidiary companies known as the Jeffrey Manufacturing Co., Ltd., at Montreal, Canada, and the Galion Iron Works and Mfg. Co., at Galion, Ohio.

Directors of the company, at a meeting held May 7, elected J. Frank Davidson to the position of vice president and assistant general manager.

Mr. Davidson has been associated with the company since 1911. Prior to his election to the vice presidency of the company he held the position of assistant general manager, having previously served as purchasing agent in charge of purchases and stores.

### Complete Line of Menzies Hydro-Separators

The Roberts and Schaefer Company, Chicago, announce the perfection of double and triple-cell Menzies Hydro-Separators to provide mine operators with a complete line of washing equipment, so made as to be available for any washing and separating arrangement, regardless of the quality or number of products required.

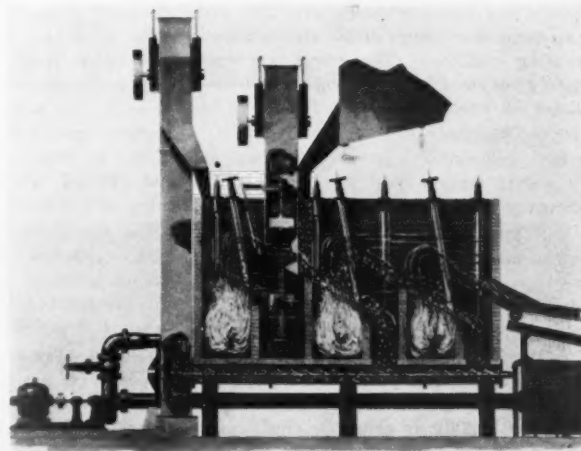
Capacities of the single-cell Hydro-Separators vary from 50 to 100 tons per hour, double and triple units being in proportion, depending upon the size and characteristics of the coal being cleaned. The Hydro-Separator method is particularly adapted to cleaning egg, nut, pea, and smaller sizes which are quickly and easily drained, but has been successfully applied on almost all sized coals of varying grades and gravities.

The single-cell installation is for com-

plete washing of sized coals, primary washing on rewash systems, for secondary washing in connection with other single-unit Hydro-Separators, for a simple washing unit when good coal appearance only is required, and for other washing and separating combinations.

Double units are for primary and secondary washing in the same unit, secondary washing of coals from other units, secondary washing of fine sizes only, primary washing where larger capacities are required, and for other washing and separating combinations.

Triple units are for use where a self-contained rewashing unit is required, secondary washing from a battery of primary washers, for use where two grades of products are required, or three grades when used as a secondary washer, and in other combinations.



The Menzies triple-unit Hydro-Separator



### I-R Has Larger "Utility" Portable Air Hoist

Ingersoll-Rand Company, New York City, has introduced a new-sized "Utility" portable air hoist of 2,000 lbs. capacity.

"Utility" hoists, in capacities up to 1,500 lbs., have been used by miners and contractors for the past three years. The addition of the 2,000-lb. size makes a type of hoist available for additional classes of work.

The uses for "Utility" hoists are varied. In mines they are used for hoisting timbers, tools, pipe, and drill steel into stopes and raises; hauling and spotting cars, hoisting muck, etc. Many of the same uses for the hoist are found in quarries and smelters as well.

The fact that the hoists are of comparatively light weight permits them to be readily moved about wherever there is work to be done. The hoists can be



The size ER Utility Hoist

bolted to a timber or mounted on a post or steel column in any convenient location.

The "Utility" employs a radial, four-cylinder, counterbalanced, reciprocating-piston-type air motor, which is reversible. All wearing parts and cylinders are easily renewable, and the cylinders are also interchangeable.

The reduction gears between the motor and drum are all machine-generated spur gears cut from carefully selected materials, and, wherever necessary, they are heat-treated to insure ample strength and wearing qualities. The gears are completely enclosed in a housing—which excludes all dust and permits the gears to operate in a bath of semifluid grease.

Ball and roller bearings are used at all points where they will add to the efficiency and life of the hoist.

The bronze throttle valve is tapered and is fitted into a bronze bushing. Its ease of operation, sensitive graduation, adjustment for taking up wear, and extremely simple design are outstanding features.

A clutch of the positive-jaw type is used to disengage the motor. This clutch is thrown out by an eccentric shaft controlled by the clutch lever. This lever

is conveniently located on the top of the hoist and automatically locks to hold the clutch either engaged or disengaged.

A brake of the bank type wraps the drum at its largest diameter. The operating lever for the brake is conveniently placed and may be adjusted to any one of six operating positions.

The motor is completely enclosed in a dust- and dirt-proof case.

### New Westinghouse Catalog on Safety Switches

A new catalog, entitled Westinghouse Safety Switches, has recently been published by the Westinghouse Electric and Manufacturing Company. It contains a complete line of porcelain-base safety switches, industrial safety switches, motor-starting switches, range and commercial cooking switches, meter-service switches and breakers, and overload protective devices. Every detail for service and longevity is the controlling factor of design. The remarkable development, the de-ion arc quencher is employed on the 575-600-volt switches.

All the ratings in this catalog are standardized according to the National Electrical Code (1930) Regulations on Switches and Motor Protection. Tables for determining wire sizes, terminal ampere ratings, and switch and fuse sizes are included. Also, the National Electric Code Regulations on Switches and Motor Protection is reproduced in the appendix.

A copy of this publication may be obtained from nearest branch office or direct from the East Pittsburgh, Pa., office of the Westinghouse Electric and Manufacturing Company, by requesting Catalog 226, dated March, 1930, Westinghouse Safety Switches.

### Link-Belt Announces "Hyper" Chain

Link-Belt Company announces the development of a new steel drive chain which will be known as Link-Belt "Hyper" chain. The chain is made from alloy steel, heat treated, and uses a new type of pin and cotter. The pins, bushings, and holes in side bars are accurately ground. The cotters are of a special type (patent applied for) and are so designed as not to work loose when once inserted and swelled into the holes provided in the pins for their reception.

The new chain combines great strength with durability. The Hyper SS-40 chain has an ultimate strength of 75,000 lbs., and the Hyper SS-124 chain an ultimate strength of 150,000 lbs.

The manufacturing tolerances to which Hyper parts are held are extremely fine, .001 in., which insures press fits of the highest order, and such fits result in a durable chain.

### Large Battery Locomotive

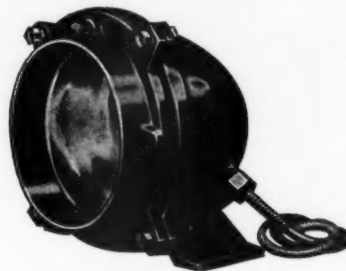
The largest storage-battery locomotive built by the Baldwin Locomotive Works and Westinghouse Electric and Manufacturing Company has been placed in service at the Michigan City Generating Station of the Northern Indiana Public Service Company. This locomotive is operated from storage batteries weighing 22 tons.

This locomotive is doing switching service and hauls coal cars from the railroad to the power house. The battery charging equipment consists of a motor generator set which in turn is operated from 2,300-volt a. c. supply lines. The batteries are charged during slack periods on the power station.

### Incandescent Headlight Equals Efficiency of Arc on Steady Voltage

Mechanization in the mining industry has focused the attention of operators on the problem of improved electric current supply, until now power is supplied to haulageways free, in a large part, from extreme fluctuations.

Headlights on main haulageway locomotives must of necessity be of high



brilliance to assure safety with the desired speed. Such brilliance has previously been obtained with the arc light, as this is the only illuminant not greatly influenced by unsteady voltage. However, many mine operators have objected to the arc because of the constant attention necessary for its upkeep.

Incandescent lights have been incorporated in the new Special MS Type incandescent mine headlight, placed on the market by the Ohio Brass Company, Mansfield, Ohio. Where voltage is fairly uniform, this light will be found to be in every way the equal of arc headlights and at the same time will eliminate the costly and troublesome upkeep expense typical of arc lights.

Following the directors' meeting of the Ohio Brass Company, announcement was made of the election of Mr. G. L. Draffan as secretary, Mr. W. A. Springer treasurer, and of the appointment of Mr. J. M. Strickle as general sales manager.

## THE MEASURE of WIRE-ROPE QUALITY IS THE SERVICE IT HAS RENDERED

Which wire rope to use on your equipment—which brand will give the longest and most economical service—may be best determined by past records of performance established under similar operating conditions. This and the reputation of the maker are of paramount importance.



FOR over half a century American Wire Rope, made exclusively by the American Steel & Wire Company, has demonstrated its superiority—proved beyond question that its tough, flexible and abrasion-resistant nature is the best insurance against breakdowns and costly delays.

Regardless of your particular problem, you will find an American Wire Rope exactly adapted to its economical solution. Consult our nearest branch office or distributor to get the right rope for your purpose.

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# WIRE ROPE

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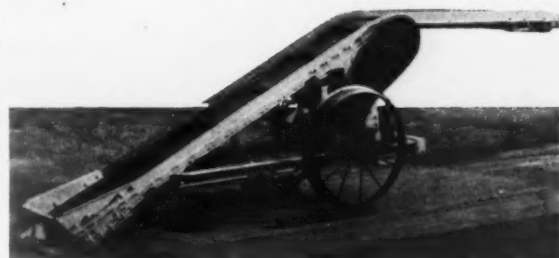
## Did you notice at Cincinnati?

THAT Pit Car Loaders are taking an increasingly important place in coal mining was demonstrated at Cincinnati. Great interest was shown both in the meetings and on the exhibition floor. There is a growing realization of the economy of this method of mechanization. Workings are concentrated, supervision is simplified, maintenance costs reduced and safety increased.

The new Mt. Vernon Loaders embody the best in this type of machine. They are easily moved and operated, have minimum power requirements, are simply and sturdily constructed, provide good protection for motor and moving parts, and are unusually adaptable to present mining plans. Write for further details.

MT. VERNON CAR MFG. CO.  
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## PIT CAR LOADERS



**NATIONAL**  
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will help you to  
**REDUCE MAINTENANCE COSTS**  
Send us your inquiries  
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J. W. Overstreet, General Manager,  
BLUEFIELD, W. VA.  
You are cordially invited to visit us and personally inspect our product

## **Lead and Zinc Number . . .**

Built around the operations of the American Zinc, Lead and Smelting Company, the articles in the September issue will cover such topics as the history of zinc in Tennessee; history of the featured company; geology, mining methods and milling methods at Mascot; personnel, safety and accident prevention at Mascot and at East St. Louis; general practice at Retort plant and Hillsboro oxide operation and Columbus oxide plant; Tri-State operations; other articles will cover cost accounting, sales and distribution, traffic problems and the uses of zinc in industry.

**SEPTEMBER**  
Issue of

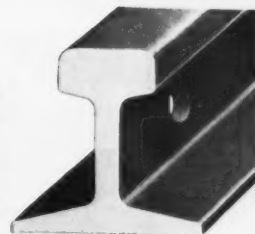
**The Mining Congress Journal**





## RAILS

Absolutely straight rails of the proper analysis rail steel for mine traffic, ready to lay and STAY LAID, will save money in replacements, derailments and labor costs. And if it's service—We carry standard sizes and lengths in stock for IMMEDIATE shipment.

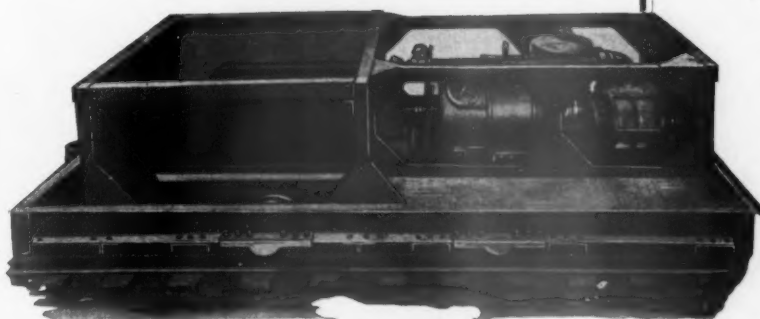


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and Save Costs*

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THE WEST VIRGINIA RAIL CO., HUNTINGTON, W. VA.



## "DUSTRIBUTORS"

*Meet Every Dusting Need*

The blower capacity of "Dustributors" is always ample with pressure sufficient to fix the dust to surfaces.

Out of the way places are easily reached with the 500-ft. extension hose on the High Pressure "Dustributor." Delivered on any reasonable trial proposition.

*Write for Catalog.*

THE AMERICAN MINE DOOR COMPANY

2063 Dueber Avenue, Canton, Ohio

## DUST WITH "DUSTRIBUTORS"

*For Economy  
and Efficiency*

From entry to face, "Dustributors" do the job of dusting thoroughly and economically. Made in two standard types they are adaptable to every mine condition; the "High

Pressure" illustrated above, designed for back areas, air courses, etc.—the "Mine Entry" "Dustributor" for the application of dust in mine entries.

Each has been carefully designed for highest efficiency yet held to simple design and construction to forestall breakdown, repairs and maintenance expense.

Let us show you why "Dustributors" will prove the best for your mines.

# TIPPLES



## —EVERYTHING FOR COAL MINING AND PREPARATION

THROUGHOUT the Coal Fields, wherever you go, you will find "United" Coal Mining and Preparation Equipment. Not only as replacement or individual equipment—but as complete Tipples as well.

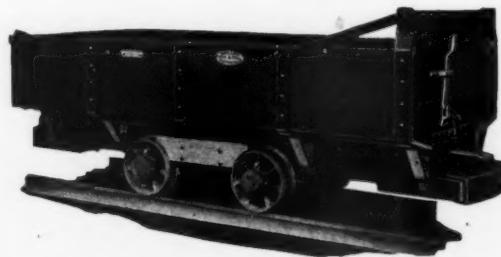
## "UNITED"

offers a complete line of Coal Mining and Preparation Equipment. Long Wall Face Conveyors, Mine Cars, Trucks and Wheels, Cages, Dumps, Screens, Feeders, Crushers, etc. Detailed information on complete Tipples—furnished complete or erected if desired—or any component part for replacement, will be given upon request.

*Your inquiries are solicited  
Catalog on request*

## UNITED IRON WORKS INC.

512 Ridge Arcade Building  
KANSAS CITY, MO.



## PHILLIPS MINE AND MILL SUPPLY COMPANY

Pittsburgh, Pa.



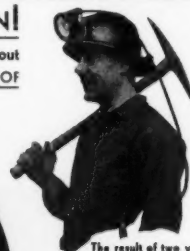
Phillips Steel Cars are fabricated over duplicating machines, and interchangeability of replacing parts can always be depended upon. Phillips parts fit Phillips cars!



*Write for Prices*

## BETTER HEAD PROTECTION!

.... A DURABLE, Molded Safety Helmet, Without Seams AND ABSOLUTELY WATERPROOF



The result of two years research and development in our experimental laboratories—a product of M-S-A Safety Engineers

## The M-S-A PROTECTIVE HAT Prevents Head Injuries from Falling Materials

Miners, quarrymen, firemen, construction men and industrial workmen welcome THE M-S-A PROTECTIVE HAT .... durable, light, well ventilated and sturdy .... strong enough to withstand severe blows .... made of a non-conducting material without exposed metal parts .... waterproof and acid resisting .... the sweatproof headband is padded .... IT IS COMFORTABLE TO WEAR.

MANUFACTURED IN STANDARD HAT SIZES  
WRITE FOR PARTICULARS

*Mine Safety Appliances Co.*  
Braddock, Thomas and Meade, Pittsburgh, Pa.

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"EVERYTHING FOR MINE AND INDUSTRIAL SAFETY"

# LOW COST PUMPING

## *Is Essential in a Coal Washery*



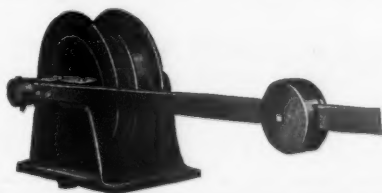
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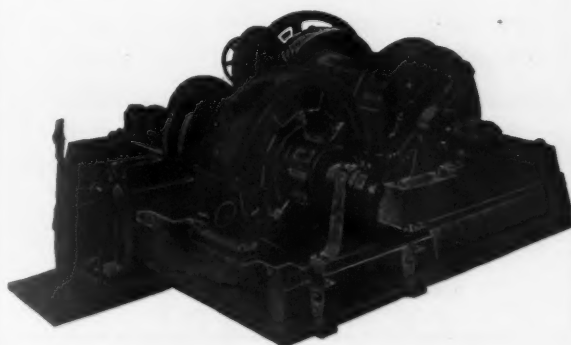
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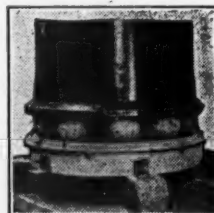
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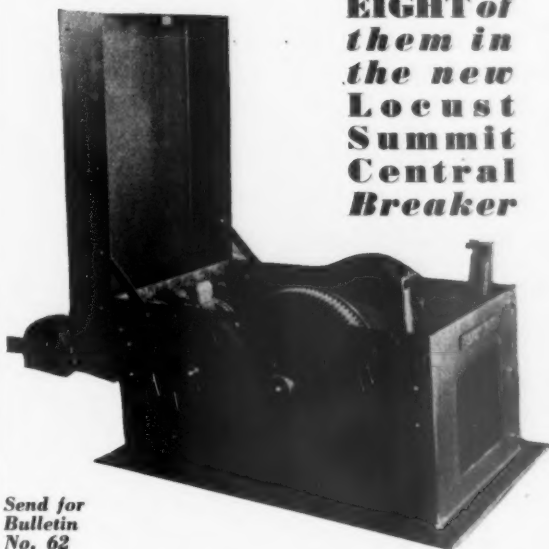
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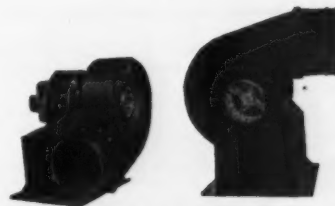
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# INDEX TO ADVERTISERS

	Page		Page
Allis-Chalmers Mfg. Co.....	15	Mine Safety Appliances Co.....	30
American Mine Door Co.....	29	Morse Chain Co.....	Back Cover
American Steel & Wire Co.....	27	Mott Core Drilling Co.....	32
Anaconda Wire & Cable Co.....	23	Mt. Vernon Car Mfg. Co.....	27
Atlas Powder Co.....	14	National Armature and Electric Works.....	28
Ayer & Lord Tie Co.....	33	Ohio Brass Company.....	16
Card Iron Works, C. S.....	33	Patrick, R. S.....	32
Carnegie Steel Co.....	13	Pennsylvania Drilling Co.....	32
Connellsville Mfg. & Mine Supply Co.....	31	Phelps Dodge Corp.....	32
Conveyor Sales Co., Inc.....	19	Phillips Mine & Mill Supply Co.....	30
DeLaval Steam Turbine Co.....	31	Roberts & Schaefer Co.....	3
Ellis Mills Mfg. Co.....	21	Robinson Ventilating Co.....	33
Ensign-Bickford Co., The.....	Inside Front Cover	Rock Springs Loader Co.....	Inside Back Cover
Enterprise Wheel & Car Corp.....	34	Roebbling's Sons Co., John A.....	5
Evans, Geo. Watkin.....	32	Stonehouse Signs.....	32
General Electric Co.....	10, 11, 12	Timken Roller Bearing Co.....	26
Goodman Mfg. Co.....	18	Tyler Co., The W. S.....	6
Hercules Powder Co.....	22	United Iron Works.....	30
Hoffman Bros.....	32	Universal Vibrating Screen Co.....	33
Holmes & Bros., Robt.....	33	Vulcan Iron Works.....	21
Irvington Smelt. & Ref. Works.....	32	Wadleigh & Bailey.....	32
Jeffrey Mfg. Co.....	7, 9	Webster Mfg. Co.....	31
Joy Mfg. Co.....	8	West Virginia Rail Co.....	29
Link-Belt Co.....	17	Westinghouse Elec. & Mfg. Co.....	25

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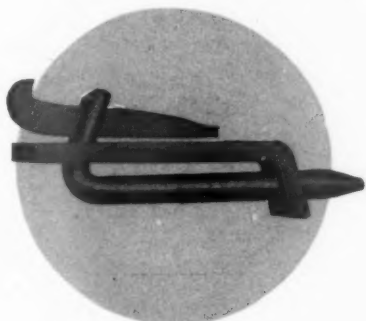
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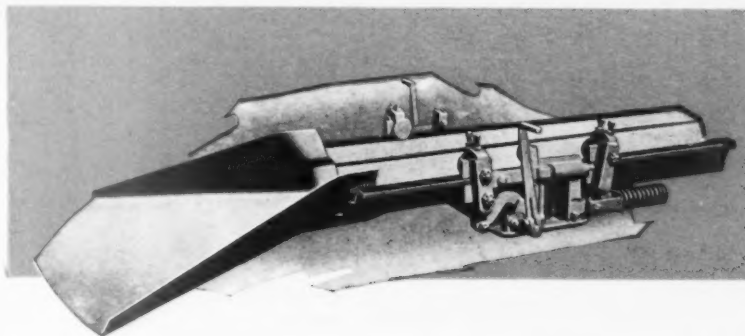


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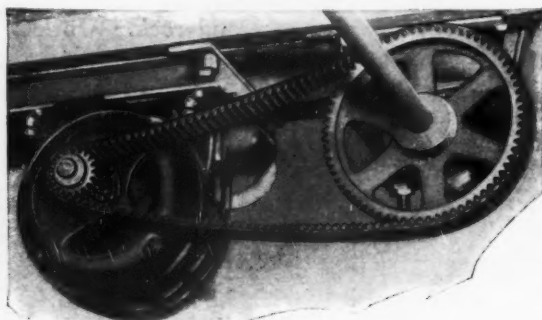
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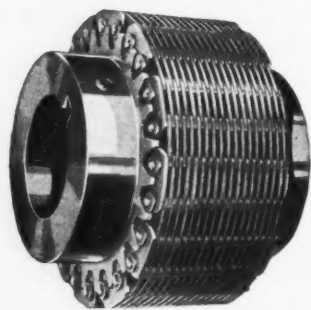
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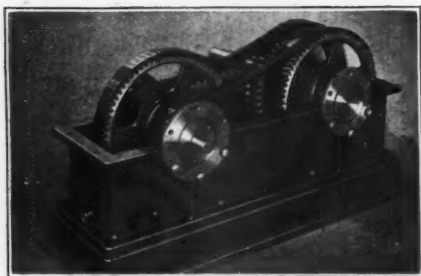
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